

△△ THE IRON AGE △△ November 22, 1934 △△

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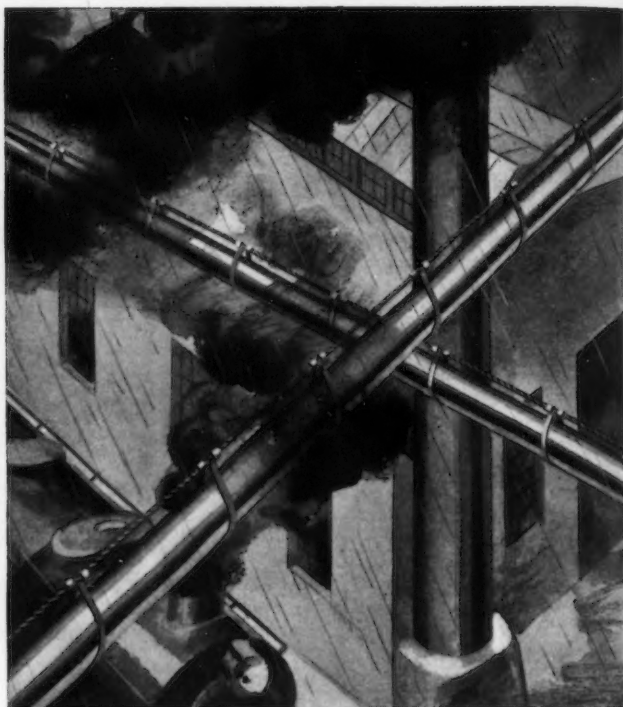
EIGHTIETH YEAR OF SERVICE TO THE METAL WORKING INDUSTRY

Take STRAND, for example

ALMOST any article produced from galvanized wire is improved and its manufacture simplified by making it from Bethanized Wire.

Take strand for example. Before Bethanizing was developed strand could not be made with a perfectly sound, crack-free coating of even the maximum thickness that could be applied by older processes. That was because no galvanized wire could be produced that would not crack under the twist and turn of weaving.

Bethanizing has changed all that. Not only can far thicker coatings be put on wire than were possible formerly, but the zinc applied by Bethanizing is so flexible that even the thickest coating will come through the weaving process uninjured. This means, also, that handling and erection cause no cracks to give rust an easy pathway to begin its work of destruc-



tion. After the strand is in place it still is shielded from the attacks of the elements and corrosive atmospheres by a thick, impervious tube of zinc.

Strand can be made of Bethanized Wire with a coating of two or three times the weight possible with older types of galvanized wire. What this means in terms of added years of service life needs no emphasis.

Similar considerations make Bethanized Wire a far superior material for many other products. Some are mentioned below.

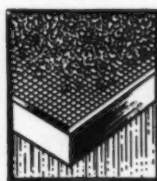


For telephone and telegraph service, Bethanized Wire offers the advantage of a coating that can be put on as heavy as the conditions call for. Higher tensile strength can be provided than is possible in wire coated by the hot-dip process. Bethanized Wire splices without surface cracks.

Bethanizing permits the use of steel springs with their superior physical properties in pumps and other locations where alloys have been used. And Bethanized Wire makes possible zinc protection on bed- or cushion-springs for marine, hospital and outdoor service.



Industrial chain-link, park, station and farm fence make full use of all of the improvements brought by the Bethanizing process: Heavier coatings that greatly increase life; no cracking of the coating in weaving; lasting fine appearance.



In screen wire the heavier coatings which Bethanizing makes possible are especially useful as, under the abrasive action of the material being screened, the life of a coating is about proportional to the thickness. A 2.4 oz. Bethanized coating lasts about three times as long as the usual hot-dip galvanizing.

Bethanized Wire, with its smooth, silvery finish, makes an excellent material for spokes in the wheels of baby carriages, tricycles and similar wire-wheeled vehicles. The fabricating operations do not damage the coating.



Bird cages and other wire articles in which appearance and serviceability are important offer a broad field for the use of Bethanized Wire. The smooth, bright surface of the wire results in a product of added salability.

BETHLEHEM STEEL COMPANY, Bethlehem, Pa.



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... THE IRON AGE ...

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The Post-Graduate Course

FOR many years business men have been studying the fundamentals of practical economics. The course has been obligatory. They were forced to learn how to make their businesses earn a profit in order to escape the clutches of the sheriff and the receiver in bankruptcy.

Now, business is turning to a post-graduate course in the broader subject of collective economics in order to escape the clutches of the social theorists.

That the "professors" of the brain trust type beat business to the study and discussion of the broad relationships of economic and social life is no cause for criticism of business as lacking in vision. The professors have had more time on their hands and have not been handicapped by the need for confronting actualities.

The average social theorist can devise and deliver a plausible social scheme of first magnitude in a mere fraction of the time that is needed to design and introduce a new adding machine.

Jules Verne could visualize the submarine, the dirigible and the rocket ship. But no one in his generation or the next had the ability to reduce these ideas to practice.

It is good news that Washington is now turning to practical business men for help in shaping recovery policies and that business men are giving attention to the broad subjects of social progress under the profit incentive system. Business approaches this task with the marked advantage of having learned the practicalities involved in making industrial wheels go around.

Business need not care what Washington does with the alphabet so long as Washington gives business a chance to help make it spell practical progress.

J. H. Van Doren

Sales Appeal of Hot-Dip

IN order to appreciate what an attractive finish means in the hot-dip galvanizing industry, it is of importance to crystallize some of the known facts and data regarding this great industry. The term "great industry" is used as this field of engineering is much larger than is generally realized.

Those not familiar with the hot-dip galvanizing industry, as well as those actively engaged in it, should find interest in the data collected from such sources as the American Iron and Steel Institute, the Bureau of Metal Statistics, the Census Bureau, the Department of Commerce Reports and the Bureau of Mines, and other standard sources of such information. The main divisions of hot-dip galvanizing are:

- Sheet galvanizing
- Pipe galvanizing
- Wire and wire products
- Structural steel
- Malleable, cast, and gray iron
- Metal ware galvanizing
- Pole-line hardware
- Range boilers and tanks
- Miscellaneous galvanizing
- Job galvanizing

To fully appreciate what an attractive finish means in these various branches, or fields of hot-dip galvanizing, the value of each, as well as the estimated tonnage of steel used, is shown on the opposite page. These figures, while they may vary slightly from any one of the sources given above, are taken from them all and, therefore, are believed to be a close approximation of the actual tonnages and values. They at least give some definite idea as to the full extent and range of hot-dip zinc coatings, and will serve to reveal what an important factor the matter of attractive finish can be to sales of these metal products.

These estimated figures when collected together reveal that the hot-dip galvanizing industry requires almost 8 to 10 per cent of the total steel tonnage, and that its value approximates almost half a billion dollars. Therefore galvanizing is truly a "great industry."

By **WALLACE G. IMHOFF**

President, Wallace G. Imhoff Co.,
Consultant in Zinc Coatings

The points of interest at this time are what the finishes for these industries are, and what is meant by an attractive finish in each case. Hot-dip galvanizing finishes fall into two general classes, namely a spangled finish and a non-spangled finish. The spangled finish is the crystallized finish that is so commonly seen on galvanized water pails, wash tubs and other well known and familiar articles of metal ware. The non-spangled finish is the non-crystallized, or frosted appearance of zinc coatings that are the result of setting or cooling the articles in a water bath. Each one of these finishes is more or less common to definite fields of galvanizing, and therefore the characteristics of an attractive finish are not the same for



Fig. 1—A mixture of the "block" and "flower" spangles. Note some of the crystals have a very irregular block form, while others that show the effects of tin additions to the bath have a star effect, the bright patches coming out from a center of crystallization.

each field, although some of them are to be found in both fields.

Spangle Finishes Are Classified

The first field to be discussed will be the finish of the spangled field. Such well known articles as the ordinary light water bucket, wash tub, drain tubs, sprinkling cans, garbage cans, ash cans, refrigerator pans, and coal hods are typical examples of this finish. These articles all belong to the field of hot-dip galvanizing known as

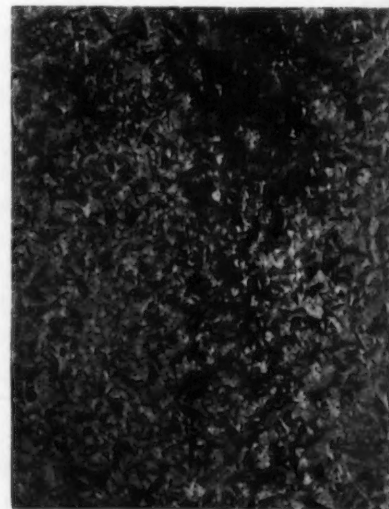


Fig. 2—A typical example of a "frosted" spangle. Note how small the crystals are on this sheet.

metal ware galvanizing. Another typical example of the spangled finish is to be found in the field of sheet galvanizing and range boiler and tank galvanizing. Although these fields are typical illustrations of the spangled finish, it must not be assumed that a spangled finish is not found in the other fields of galvanizing. For example, ship plates and other miscellaneous articles of job galvanizing are usually spangled; large smoke stacks, funnels, troughs, boxes, bins, and in fact most work of that type that are air-cooled are usually spangled.

At present there is still no definite classification of spangles. Such a classification at this time will therefore

Zinc Coatings ▲ ▲ ▲

perhaps be helpful in labeling the different types of spangled finishes so that they can be definitely referred to throughout this discussion.

The following names and characteristics have been applied by the writer



Fig. 3—This is a "burned spangle." The galvanizing bath has been too hot and the time of submersion in the bath too long for this gage of sheet.

to the specific spangled-finished zinc coatings described below:

(1) BLOCK SPANGLE

This finish is the bright spangled finish given to galvanized iron when only aluminum has been added to the galvanizing bath. The crystals, or flakes, are in blocks or triangles, and other odd shaped blocks of bright and dull patches over the surface. A surface having a mixture of block and flower spangles is shown in Fig. 1.

(2) FLOWER SPANGLE

This term is generally applied to all those forms of crystallization of the spangle that look like a "fern" or "flower." Types of this spangle are as follows:

(a) FLOWER SPANGLE: Very large flower-like crystals due to tin additions to the galvanizing bath. Common on sheets and some metalware articles, as well as other large articles made from sheets. Often in five-pointed stars.

(b) FERN SPANGLE: The fern spangle is usually found when a number of

different metals have been added to the galvanizing bath. The crystal resembles a very large fern, and the larger its size the more beautiful the finish.

(3) PEARL SPANGLE

This finish is the type of spangle given to a zinc coating when either antimony or cadmium have been added to the galvanizing bath. The finish has a very beautiful pearly lustre and is very desirable from the standpoint of sales.

(4) FROSTED SPANGLE

This finish is that type of a spangle which for some reason has made the spangles or crystals extremely small giving the sheet a frosted finish. Such a finish is not very desirable, and often either stops sales entirely, or the article must be sold as a second. A spangle of this type is shown in Fig. 2.

(5) BURNED SPANGLE

This type of finish usually results when the galvanizing bath is too hot or the time of submersion in the bath too long. The crystal forms are not present. The sheet has a dull white, grainy finish, and is usually lined or webbed in effect. In cases of extreme heat the coating may be burned off entirely and the surface has a dull gray or greenish appearance.

Because of the difficulty in setting a standard for the different kinds of spangles the five general classes just given will perhaps serve temporarily to definitely place each finish. In some galvanizing plants the "block" spangle has been called the "aluminum" spangle because such a finish is obtained when only small quantities of aluminum have been added to the galvanizing bath. For the same reason in other plants the "flower spangle" has been called the "tin" spangle because

THE subject of spangles of hot-galvanized iron has been discussed many times, thereby indicating the complexity of the process. This article, however, does not examine the technical aspects, but is devoted to various galvanized finishes as related to consumer appeal, which in turn is usually reflected in sales. The author presents a clear classification of spangles, discusses the utility of the various spangles and sums up by classifying the value of the appearances of various types of coatings. This discussion is of importance, as it adds to the available information concerning a process which is still of major importance despite the competitive pressure of other types of coatings.

in those plants only tin additions have been made to the galvanizing bath. Cadmium and antimony coatings have been called both the "flower spangle" and the "pearl spangle," and often the coating is said to have a "pearly" lustre.

Pearly Spangle Most Desirable

Neither time nor space will permit going into a detailed discussion of the factors that control the kind of spangles which form, and what factors are involved in developing the individual characteristics of the spangles. Such definite factors as the quality of the steel base, the temperature of the soaking pits, the rolling and heat treatment, pickling operations, fluxing, the temperature of the galvanizing bath, the thickness of the steel base, the smoothness of the surface, the metal additions to the galvanizing bath, and the time and methods of cooling have all been found to influence the kind, size, and shape of the spangle formed on the finished product. Due to these many different factors the controlling features have

GALVANIZING TONNAGES AND VALUES FOR 1929

BRANCH OF INDUSTRY	TONNAGE	VALUE
Sheet galvanizing	1,103,733	\$110,373,300
Pipe galvanizing	487,441	48,744,100
Wire and wire products	1,350,497	108,941,287
Structural steel	41,632	4,163,200
Metal ware galvanizing	44,663	8,398,313
Pole-line hardware	92,264	9,226,400
Range boiler and tanks	27,000	2,700,000
Malleable iron castings	24,000	1,440,000
Miscellaneous and job	120,000	4,800,000
TOTAL (About 6 per cent Total Steel Output)	3,291,230	\$298,786,000
Cornices, spouts, gutters, stove pipe, bins, etc.....	2,161 Commodities	\$222,484,625

been covered so that much confusion has resulted in the practical control and development of spangles on such products requiring a spangled finish. Some of the most important factors involved are the metal additions to the galvanizing bath, the speed through which the article passes in and out of the bath, the temperature of the bath, and the thickness of the base metal. Other factors such as pickling and fluxing do play a part, but the most important are metal additions, submersion time, bath temperature and gage of the metal base.

In addition to the spangle of the spangle-finish coating other factors enter into the sale of the product. Such additional qualities as smoothness of the coating, freedom from flux spots, bare spots and other blemishes, lustre, dross specks, lumps, run-off metal, sharp drip points of metal, and other factors all enter into this finish. The most saleable type of finish, and the one that from a sales point seems to be the most attractive, is the "pearly" spangle. Such a finish will not discolor so quickly as others and does not tarnish easily when exposed to the air.

The fields of metal ware and sheets show the spangle finish of galvanizing at its best. Both of these fields show a direct sales relation to the attractiveness of the finish of the product. The housewife knows nothing about galvanizing; she makes her purchases mainly upon the appearance and the finish of the article, and in this field of galvanizing an article that looks good usually is good. Quality and appearance in metalware galvanizing go together.

The second division in the finish of zinc coatings is what is generally spoken of by the trade as a "non-spangled" finish or coating. As with the spangled finish there is no set standard of quality, and this is perhaps for a good reason, namely that it is hard to make a set of standards that could be applied in a practical way. However a few words may be said about this finish that will show that there is an attractive finish for this division also, and that such a finish will greatly increase the sales of those galvanized products that do have a high quality of non-spangled finish.

It might be well to explain just what this non-spangled finish is, how it is made and what makes it different from the spangled finish. Also why it is different as well as whether such a finish is as durable or as good in service value as a spangled finish. A non-spangled finish in galvanizing is that metallic finish given to the

coating when crystallization is checked by immersing the article in a water bath just as soon as the metal has "set," that is it has ceased to be a liquid. The result of this action in quenching or cooling the coating in water is a metallic appearance. However there is an entire lack of the crystals that form when the same article might be allowed to cool in the air. Another purpose of setting the coating is to keep it from burning off. On heavy articles there is so much reserve heat in the material that if the coating is not set by cooling sufficiently, the coating when exposed to the air will quickly oxidize due to the rise in surface temperature because of the flow of reserve heat in the piece. As a result the zinc coating takes on a dull, frosted, white look. It is needless to say that such a finish often stops the sale of the article. An idea of what happens to the coating may be obtained by referring to Fig. 3, which shows a "burned spangle" due to too high temperature and a prolonged immersion.

Before going into further details of the non-spangled finish it is of interest to see what fields of galvanizing utilize such a finish. Looking down the list about the first is pipe galvanizing, then wire and wire products, structural steel, some malleable iron castings such as pipe fittings, etc., pole-line hardware galvanizing, and many articles of job and miscellaneous galvanizing. In actual tonnage the non-spangled finish perhaps rates very close to the spangled finish.

A few typical examples will serve to definitely show where this finish is usually found. Practically all pipe has a non-spangled finish; angles and girders, ladders, wire, fence and other wire products; structural steel of various kinds, pole-line hardware such as pole pins, braces, washers, lag screws, etc.; all kinds and sizes of galvanized nails and spikes; wire window frames and wire screens; all sizes and kinds of nuts and bolts; trays and rods of various kinds, shapes, and lengths; fish plates and like railroad hardware; brackets of various kinds and sizes; malleable and cast iron pipe fittings, such as elbows, etc.; castings for various kinds of machinery; and so on through many other fields.

A typical illustration of this type of work is shown in Fig. 4 which pictures a tower for a high tension line. Radio towers, towers for air beacons, structural members for switching stations, etc., all belong to the same general class of hot-dip zinc coatings.

The next question is, "what is an attractive finish in a non-spangled

galvanized coating?" The answer to this is that such a finish is a bright, smooth coating, with no scurf or dirt in it, no lumps of metal or sharp run-off zinc points, no bare and exposed steel spots, no black flux spots, no bluish flux tarnish, no white smear, no white rust, and no threads or like parts to be filled with metal. In addition the coating must be of such quality that it will meet the standards of specification set up for a zinc coating for such use. Most of these tests and standards are clearly set forth in the book of Standards of the American Society for Testing Materials.

The long list of galvanized products is so diversified that no standard treatment can be suggested to give all an attractive finish. However there are a few basic qualities that apply to all non-spangled finishes and a word may be said that will cover the most of them.

Large Bath Gives Smoother Coating

A clean smooth coating is very desirable for all these articles. Smoothness can best be explained by going into the causes that make a zinc coating rough. One very common cause of a rough finish is that the bath is very highly contaminated with iron. This, together with the addition of aluminum, tends to make the coating freeze very quickly when it leaves the bath and becomes exposed to the cooling action of the air. In many cases the coating freezes before the pieces have a chance to drain properly, or when a number of articles are done together the coating of one sticks to the other, thereby resulting in a very rough unsightly finish.

The melting point of aluminum is very much higher than that of zinc. When the iron in the bath is high and there is an excess of aluminum there is a tendency for the metal to become very sluggish and sticky. Such a condition of the bath which decreases the fluidity of the metal also tends to produce a very rough finish.

Another very undesirable feature is scurf and dirt in the coating. This often happens when the size of the bath is too small and the scum and dirt cannot be kept off the work when it is being withdrawn. There are many reasons why it is more economical to have too large a bath than too small a bath, but no attempt will be made at this time to explain them. However it may be said that a much smoother and better finish will be obtained from a large metal capacity as compared with one that is too small. The reason, of course, is the fact that the bath in the large case is al-

ways in better condition than the smaller bath.

In some cases small dross specks mar the coating and make the finish very rough. There is no set time to dross a galvanizing bath. The best that can be said is to keep it free of dross at all time, and dross when-

be allowed to just reach the freezing stage when the piece is lowered into the water. This means that all of the excess zinc has had an opportunity to drain off. At the point of run-off the excess can be quickly scrapped or shaken off just before the article is lowered into the water. On some

standpoint. The brightness of the coating may be destroyed in a number of ways. A very common way is to allow the article to come out of the water quench too cold and too wet. If the articles are chilled "dead cold," and no reserve heat is left in them, then water will come out with the coating and stay on it. Such practice causes the work to be piled wet and this in time develops "white rust," a heavy white deposit which if left long enough will eat entirely through the zinc coating and leave the black steel base exposed. The work should always be drawn from the water bath quick enough to leave sufficient reserve heat in the piece to thoroughly dry the coating by the time the object reaches the pile or storage bins. Thus if no moisture or water of any kind is left on the work and it is perfectly dry when stored, and the storage bin and conditions are dry, then the coating will remain bright and have its beautiful bright metallic lustre.

Neither time nor space will permit further discussion of the value of an attractive finish for zinc coatings in so far as benefiting sales are concerned. In some fields, such as the metalware field, an attractive finish is absolutely paramount in increasing sales. The more attractive the finish the faster the objects will sell with other factors being equal. Everyone is attracted by the beautiful pearly, flower-like spangle, or crystallization sometimes seen on galvanized products. And what looks good generally is good. In some places large additions of tin have been made to the bath and this gives the work a very bright finish.

In the non-spangled field such articles as pipe fittings are very attractive when they have a smooth bright finish. As may well be imagined this is usually very difficult and requires much practical experience and skill in the art of zinc coating to obtain these smooth bright finishes. Some products are dull, blue, and rough, and such a finish actually retards the sale of the product. Those selling this finish are often in direct competition with others turning out the same product with a beautiful, smooth bright finish.

In conclusion it might be said that there is perhaps no industry where an attractive finish will give greater returns and profits than in zinc coating. However, to obtain a desirable finish in each field of galvanizing generally requires much study and years of practical experience. A beautiful spangle finish on the one hand, and a smooth, bright finish on the other repay in profits the time and effort given in obtaining them.

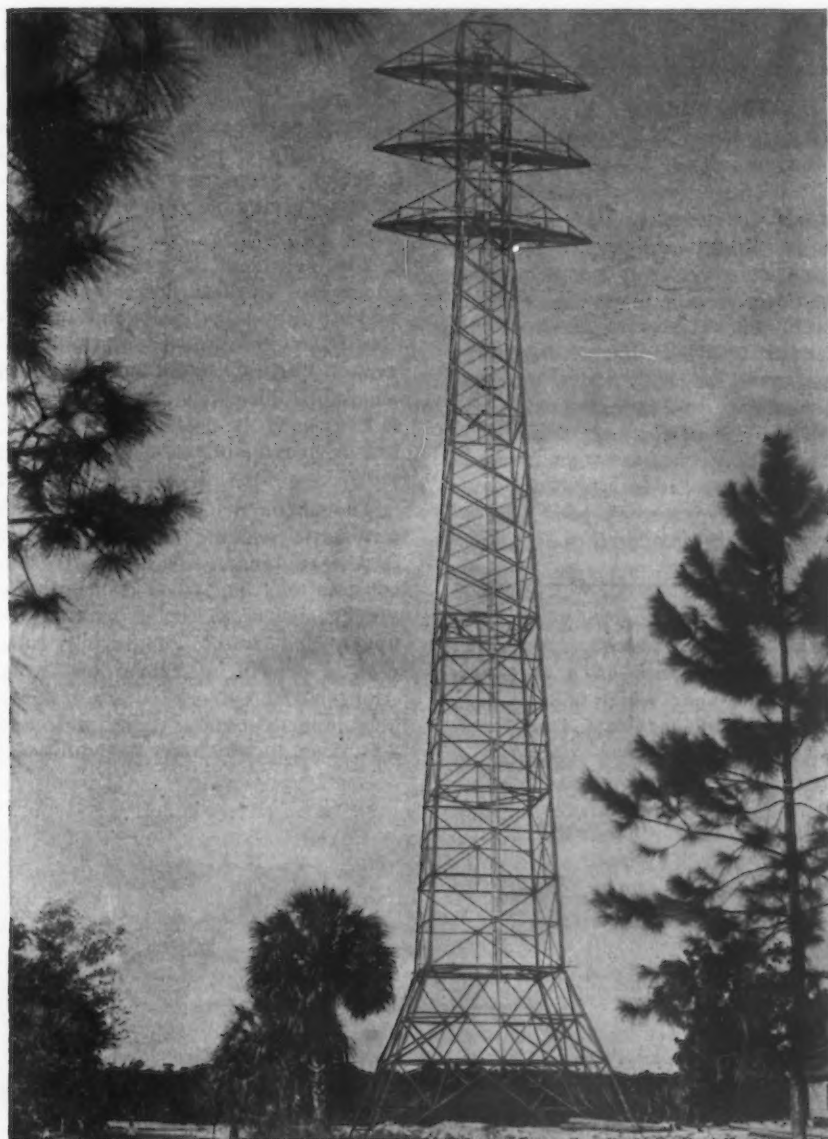


Fig. 4—A typical example of structural steel galvanizing. Angles and light structural members are usually non-spangled in finish. Galvanizing performed by Bessemer Galvanizing Works.

ever it is practical to do it. Drossing the bath serves two purposes, namely it removes the dross which decreases the fluidity of the bath and, second, due to the metal removed it furnishes an opportunity to add a large quantity of new metal which gives new "life" and betters the quality of the zinc in the bath.

A very common cause of a rough finish with the non-spangled zinc coating is incorrect setting of the coating in the water bath. The coating must

pieces it is found that by turning the article in the opposite position for a second that the excess metal will run back on smoothly, and then the article can be lowered into the water. Still other pieces require hammering or tapping as the work is drawn and long edges are usually scrapped with a file or other suitable implement so as to leave the coating smooth.

Brightness and smoothness are two extremely desirable factors in making a product more attractive from a sales

Pressure Vessels Welded Auto

AT its Carteret, N. J., plant the Foster Wheeler Corp. is now manufacturing weld fabricated pressure vessels under the A.S.M.E. code for class I unfired pressure vessels. A.C. automatic arc welding is used exclusively for all seams excepting tank fittings, which are applied by hand welding with A.C. This installation has been in successful operation since the latter part of May of this year and has turned out approximately 225 tons of class I vessels up to Sept. 1.

This concern has been actively engaged in weld fabrication for several years, but only recently has equipped for Class I pressure vessel welding. The data given at this time are not intended as an impressive display of quantity production, but as an example of high quality welding with A.C. successfully applied.

The welding shop is approximately 400 ft. long by 75 ft. wide, and is equipped with seven bridge cranes for material handling. Three-phase, 60-cycle primary power is purchased from the Public Service Electric Co. of New Jersey, at 26,400 volts. A bank of six General Electric 150-kva. transformers step this down for the 220-volt, 3-phase, 60-cycle shop supply. Direct current for variable-speed drives, such as the automatic welding machine, the travel carriage motors, and the rolling device drives, can be furnished from a 220-kw. 275 volt D.C. generator, driven by a 260-hp. synchronous motor.

It should be stated that at the time this paper was written certain elements of the shop equipment had not as yet been placed in their final position. However, as the layout is already planned, our description will make the temporary assumption that all equipment is installed in its intended location.

Most of the plate stock is purchased from the mill as required, this being common practice, I believe, for such work. However, a small stock of light gage plates is kept on hand, at present in outdoor storage.

Often it is found desirable to have the plate edges machined at the mill

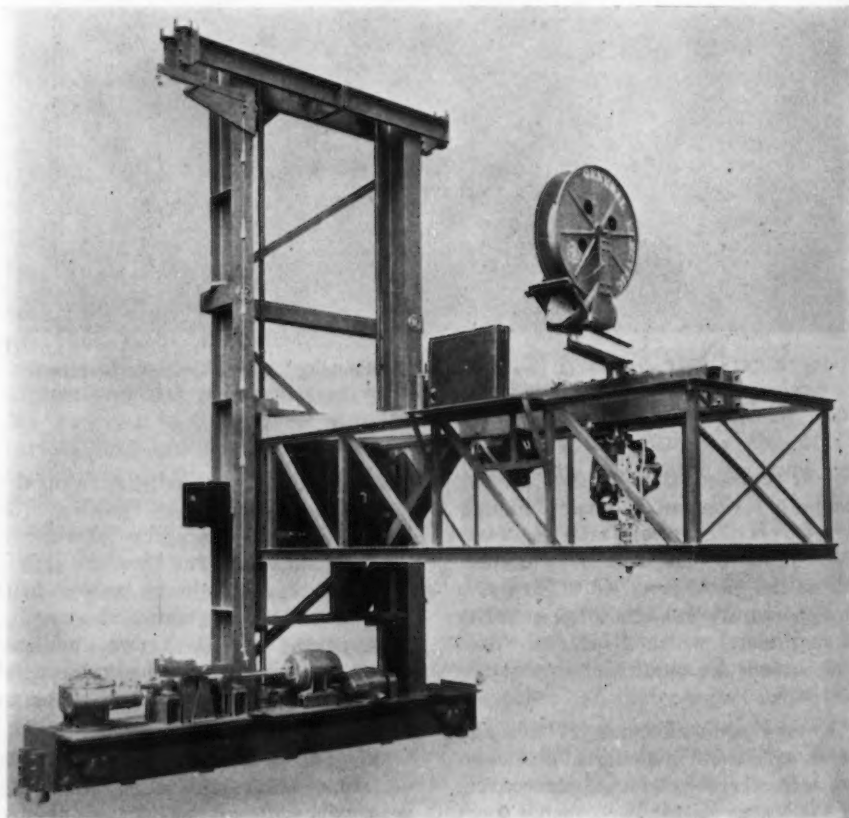
USE of automatic A.C. arc welding at the Carteret, N. J., plant of the Foster Wheeler Corp., is described in this part of the paper presented by Mr. Tilton at the fourteenth fall meeting of the American Welding Society, held recently in New York. The complete paper covers a general discussion of the A.C. welding process, including advantages and disadvantages, as reported in *THE IRON AGE* of Oct. 11, and also a description of the transformers, automatic arc welding head and fixtures developed by Mr. Tilton's company for this type of welding.

to the specified groove. All other stock can be planed on a standard-type plate planer, which is 38 ft. long and will handle at least 4-in. thickness without difficulty.

Shells from 33-in. minimum diameter up to the largest which can be shipped, 14 ft. diameter, can be rolled on the 200-ton rolling equipment. A hydraulic pressure brake takes care of the preliminary braking of the plate edges.

The east end of the building is given over to these preliminary operations. Hand welding stations are located at convenient points in this section for tack welding. The tack welding is done with 3/16-in. diameter G.E. type W-20 electrodes, using A.C. and approximately 150 amp. and 23 volts.

The shells are then taken to the automatic welding machine, located in the center of the building. This consists of the travel carriage assembly shown in Fig. 1, mounted on upper and lower supporting rails, with a length of travel of 70 ft. Alongside this track is a pit 65 ft. long, approximately 12 ft. wide and 3 ft. deep, in which are four units for



atically by A.C. Arc Process

holding the vessels. Two of these and a portion of the pit are shown on Fig. 2. Each alternate unit consists of a motor-driven rolling device, the other units being idling rollers. The motor-driven units are synchronized by a Ward Leonard control. For longitudinal seams the rolls remain stationary and the travel carriage moves along the seam, whereas for circumferential seams the travel carriage remains stationary and the shells are rolled under the arc. Each device is adjustable as to speed, from 2 to 15 in. per min. Vessels from 2 to 14 ft. in diameter and up to 70 ft. in length can be handled on this equipment.

The welding procedure is as follows:

The bevel or groove is shown in Fig. 3 for plate thicknesses up to and including $\frac{1}{2}$ in. and in Fig. 4 for all heavier plates. Experience has proved that the angle of V-bevel and of the sides of the U-groove are an

By O. A. TILTON

Industrial Engineering Department,
General Electric Co., Schenectady

important factor in obtaining successful results. Wider angles add nothing to quality and increase costs by requiring more weld metal deposit, which also reduces net welding speeds. Narrower angles tend to produce undercutting of the bottom layers of weld metal, thus entrapping slag and increasing the effort required in cleaning between passes and in repairing defects detected by the X-ray.

The first welding operation is the longitudinal seam. The tabulation in Fig. 5 gives the plate thickness, type of bevel (U or V), and its dimensions and the number of layers or passes. Fig. 6 gives typical welding data and includes the electrode type and diameter per pass, the corresponding welding current, arc voltage, welding

speed, wire consumption and oscillation amplitude and frequency. These data apply to circumferential seams and are irrespective of vessel diameter or length.

The order of procedure is to weld the groove full, including reinforcement at the top, then chip off the backing-up strip and reweld the back of the groove by hand, filling in the weld metal that was removed in chipping off the backing-up strip, and reinforcing the weld on the back. Welding layers average $\frac{1}{8}$ in. in thickness and reinforcement extends above the plate surface, the amount required by the boiler code. This reinforcement is chipped off on all fired pressure vessels or when the customer requires it to be done on other vessels.

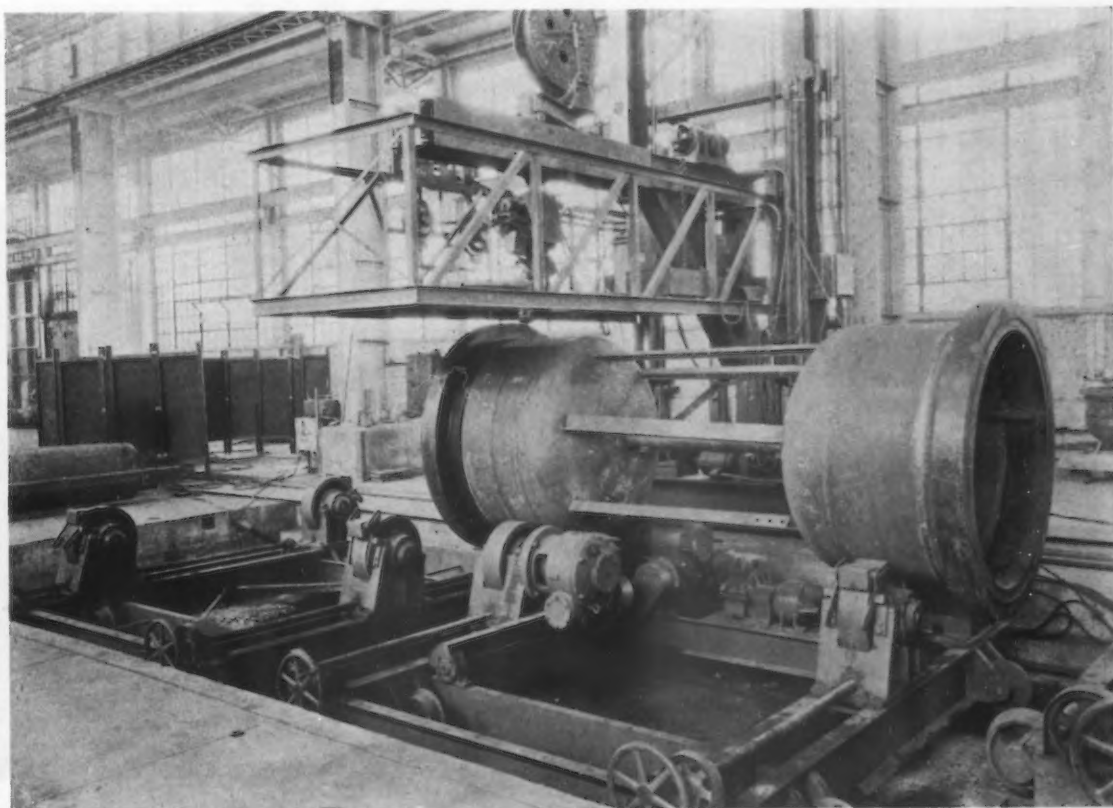
Cleaning between passes is accomplished by loosening the slag with a hooked instrument much like a pinch-bar. The chips are blown out and the oxides and spatter are removed from the sides of the groove with a

AT LEFT

Fig. 1—This automatic arc welding machine is located in the center of the welding shop, is designed for welding vessels ranging from 2 to 14 ft. in diameter. The travel carriage assembly, which is mounted on upper and lower supporting rails, has a travel length of 70 ft.

AT RIGHT

Fig. 2—Another view of the automatic welder, showing also a portion of the 65-ft. long pit which contains four units for holding the vessels being welded. Alternate units are equipped with motor-driven rolls. For longitudinal seams the rolls remain stationary and the travel carriage moves along the seam; for circumferential seams the travel carriage remains stationary and the shells are rolled under the arc.



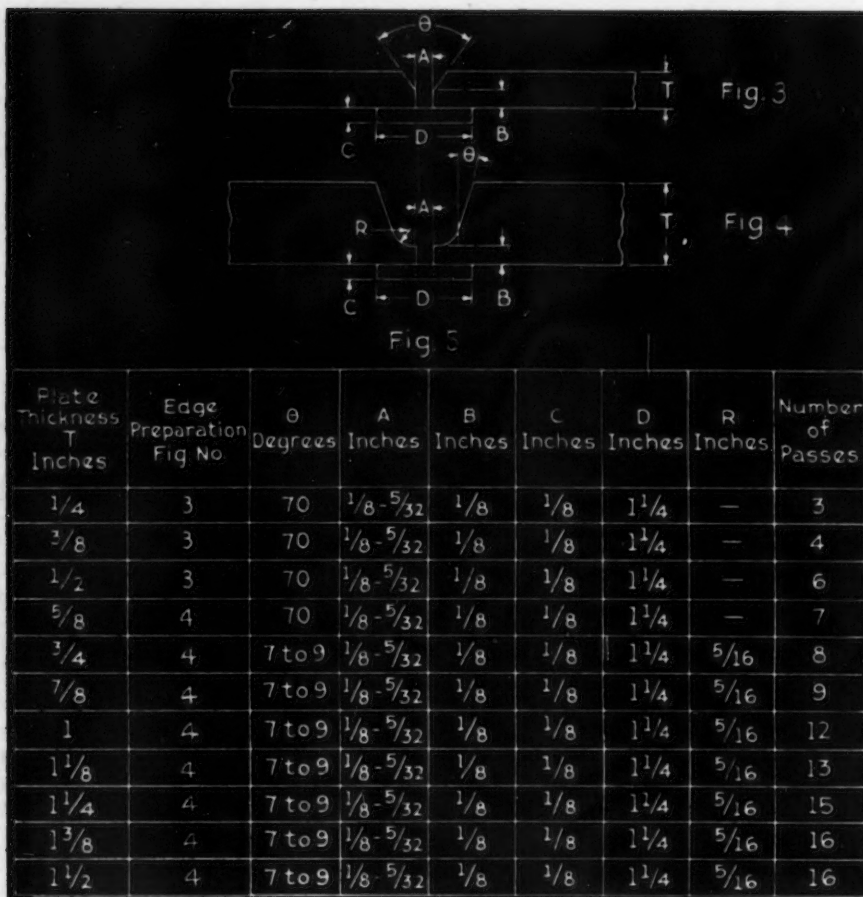


Fig. 3—Bevel or groove for plate thicknesses up to and including 1/2 in. Fig. 4—Bevel or groove for heavier plate. Fig. 5—Table giving type and dimensions of bevel and number of layers or passes for material of various thickness.

pneumatic tool. The weld is then cleaned again with a hand wire brush.

The welding transformer for the automatic is rated 750 amp., 1 hr. or 575 amp. continuous, 40 volts secondary. Five hundred-ampere transformers are used for hand welding. No P. F. correction is applied, as other plant equipment provides sufficient

corrective kva. in synchronous motor drive. Phase balancing is sufficiently well taken care of by distribution of the single phase units on the three phase system.

After welding, the test plates are removed and all seams are marked with the usual lead identification markers for X-ray examination. Fig.

7 shows a typical shell, before removal of the test plates and with markings for X-ray examination. Every seam is examined with a G.E. X-ray machine equipped with a 300,000-volt tube. Fig. 8 shows the X-ray machine in position for examining the circumferential seam of a vessel. This machine is of the most modern type and is mounted on a special truck for ready portability. Defects when found are chipped out, rewelded and X-rayed again. A permanent record is kept of every inch of welded seam.

To date, this company has automatically welded and X-rayed 1400 linear feet of welded seams and has found 0.04 per cent of defects which have been completely eliminated before completion of the vessels. This remarkable record is particularly notable when it is known that all the defective welds are considered to have been due to imperfect plate edge preparation. The company states that when it has eliminated the defective grooving it expects to practically eliminate the small number of weld defects that are now being encountered.

The test plates are the first to be X-rayed. They are then removed and while the vessel itself is being examined, these samples are stress relieved in a small electric furnace under exactly the same conditions that will be applied to the entire vessel. These conditions are accurately controlled and recorded for duplication on the vessel. Physical tests are then made and the check tests of the seam are completed nearly as soon as the vessel is ready for the furnace. No case has yet been found where the physical tests fail to meet all the requirements of the code.



Fig. 7—Typical shell before removal of test plates, and with markings for X-ray examination.

Fig. 8—Portable X-ray machine positioned for examining the circumferential seam of a vessel. It is equipped with a 300,000-volt tube and is mounted on a special truck, as shown.



The following average physical properties after stress relieving at 1200 deg. F. have been obtained on A.S.M.E. S-1 boiler plate:

Ultimate tensile strength, lb. per sq. in.	65,000
Yield Point, lb. per sq. in.	54,000
Elongation, 0.505 in. specimen, per cent in 2 in.	31
Elongation, free bend, per cent.	52
Specific gravity	7.825
Impact (Charpy), ft. lb.	33

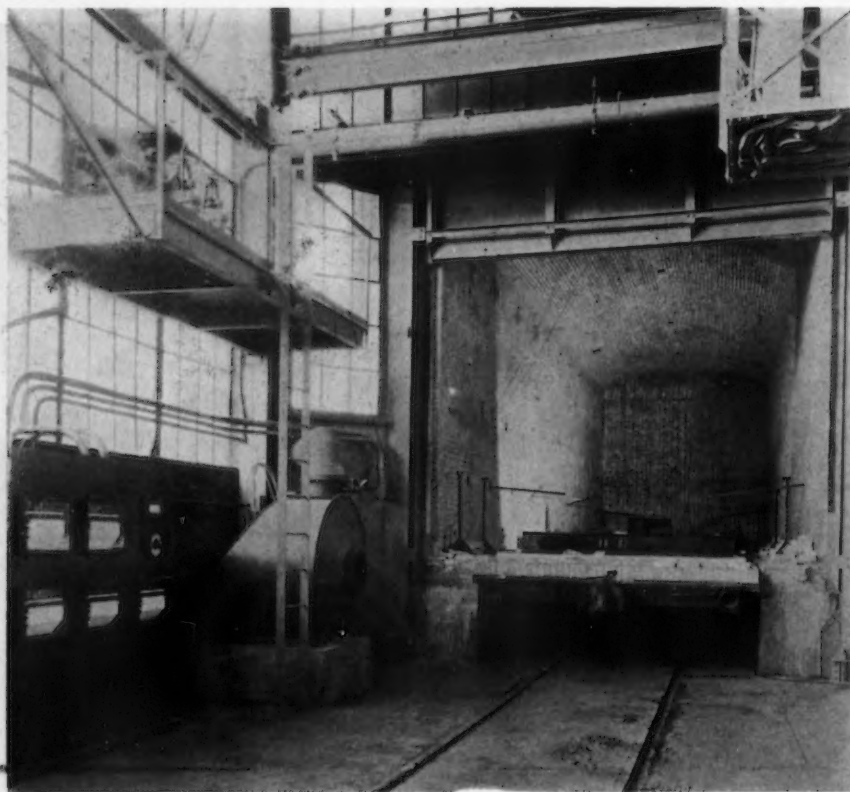
After being X-rayed, the complete shell is placed in the butane-gas-fired furnace shown in Fig. 9 which will accommodate vessels up to 14 ft. in diameter and 30 ft. in length. The Butane storage tank pictured in Fig. 10 is located outside the southwest end of the building. This tank is a Class 2 vessel, also welded with the equipment and process described. The furnace is located at the northwest end and just outside the welding shop.

Strain relief annealing consists of heating to 1200 deg. F. and maintaining this temperature for one hour per inch of maximum thickness, then cooling to 500 deg. F. in the furnace. The rate of increase and decrease in temperature is: 3 hr. to raise from room temperature to 1200 deg. F. and 5 hr. to cool to 500 deg. F.

Hand welding of fittings is done with G.E. type W-23 electrode and A.C. The work is positioned for this

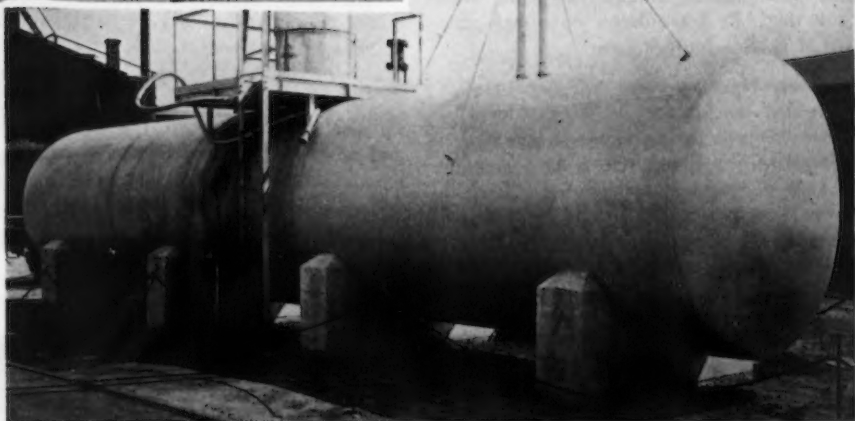
Fig. 6—These welding data apply to circumferential seams.

Plate Thickness Inches	Description of Passes	Pass No.	Electrode Diameter Inches	Welding Current Amp	Arc Voltage	Approx. Welding Speed Inches per Minute	Electrode Consumption Pounds per Minute	Oscillation	
								Approx. Amplitude Inches	Frequency Osc./min.
$\frac{1}{2}$ "	Bottom of Groove	1	5/32	130	25	7½ to 8	.045	None	
		2	3/16	175	28	6	.074	None	
		3	3/16	175	28	5	.074	1/32	
	Hand Backing Beads	4	1/4	275	30	4¾	.13	1/16	
		5	1/4	275	30	4½	.13	1/16	
		6	1/4	275	30	4¼	.13	3/32	
$1\frac{1}{2}$ "	Bottom of Groove	1	3/16	175	28	7½ to 8	.074	None	
		2	3/16	175	28	6	.074	None	
		3	1/4	380	38	5	.20	1/32	36
		4	1/4	380	38	4¾	.20	1/16	36
		5	1/4	380	38	4½	.20	3/32	36
		6	1/4	380	38	4¼	.20	1/8	36
		7	1/4	380	38	4	.20	5/32	36
		8	1/4	380	38	3½	.20	3/16	36
		9	1/4	380	38	3½	.20	7/32	36
		10	1/4	380	38	3¼	.20	1/4	36
		11	1/4	380	38	3¼	.20	9/32	36
		12	1/4	380	38	3¼	.20	5/16	36
		13	1/4	380	38	3	.20	11/32	36
	Hand Backing Beads	14	1/4	380	38	3	.20	1/16	
		15	1/4	380	38	3	.20	3/32	
		16	1/4	320	38	3	.16	1/8	



operation insofar as possible although the electrode used will produce Class 1 welds in any position with A.C. Fig. 11 shows a typical vessel with the hand welded fittings being attached.

Automatic welding has proved so satisfactory that in every case in which it is possible to do so, hand welding has been eliminated. Fig. 2 shows the adaptation of two heavy flanged heads for the automatic.



UPPER LEFT

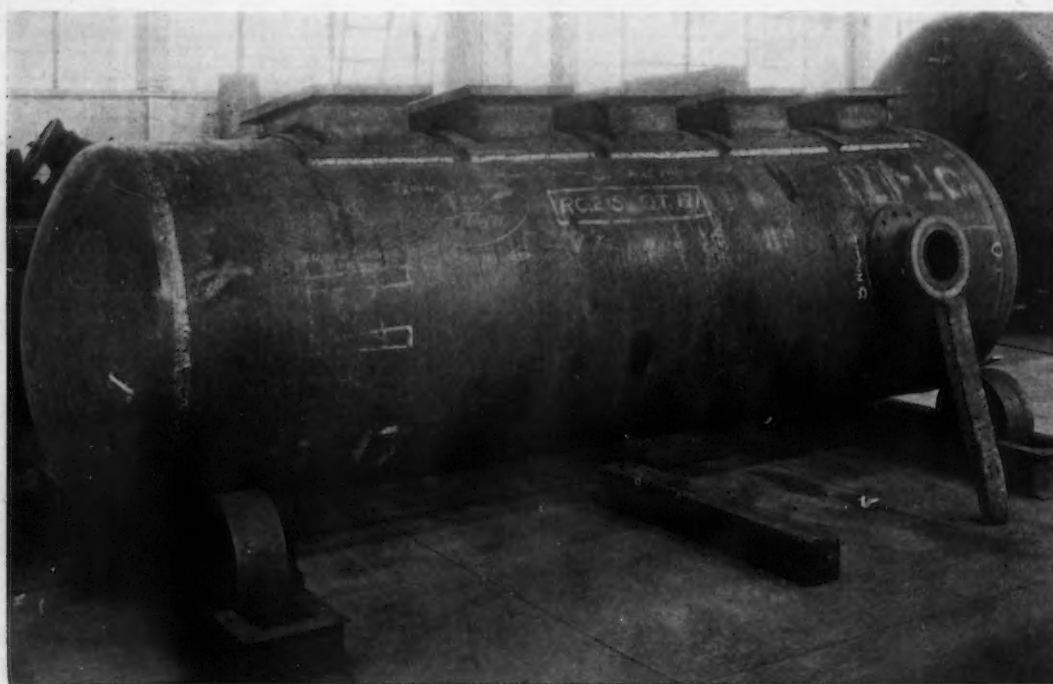
Fig. 9—X-rayed shells up to 14 ft. in diameter and 30 ft. in length are placed in this butane-gas-fired furnace. Strain relief annealing consists of heating to 1200 deg. F. and maintaining this temperature for 1 hr. per inch of maximum thickness, then cooling to 500 deg. in the furnace.

ABOVE

Fig. 10—Butane gas storage tank located outside of the welding shop. It is a Class 2 vessel, also fabricated by the automatic A.C. arc process.

AT LEFT

Fig. 11—Fittings are hand welded by A.C. equipment, using type W-23 electrodes. So far as possible the work is positioned for this operation.



How Attractive Finish Helps Metal Products Sales

28—Some Practical Finishing Problems

IN approaching actual finishing problems many detailed considerations arise which are difficult to express in generalities, and for that reason some actual experiences are presented here. Occasionally a few dollars added to the cost of finishing material may result in a possible saving of many more dollars in handling cost.

Golf Club Heads

Metal golf club heads require a high finish for sales value and at the same time a durable finish to withstand rough treatment. V. W. Jared, factory superintendent, Burke Golf Co., Newark, Ohio, furnishes the following description of the actual finishing processes on golf club heads at his plant:

"For mass production of a metal product rapidity of operation is one of the essential features, yet in the case of golf club heads a high type of finish sets up immediate competition with the rapidity of operation feature. In our sequence, polishing operations fit between two other major operations, namely, the grinding before the finish polish and the plating afterward. This latter is usually a sequence ending with a chromium coating.

"The nature of the chromium plate determines to a large extent the nature of the polishing operation. If we plate directly on the steel we must follow one sequence, whereas if we copper plate, nickel plate, and then chromium plate, another sequence is called for. For simplification I will

By HERBERT R. SIMONDS

select an instance of chromium plating direct to the material. This means that the finish before plating must be free of wheel scratches, indentations, or marks of any sort, since this particular kind of plating magnifies many times over any surface imperfection of the base material.

"The irregularity of golf club heads, with their many lines and curved surfaces, introduces many problems which do not exist with simpler articles. Imprintings, decorations, and straight edges of golf club heads must not be jeopardized in the polishing processes. Also, some surfaces must be bright finished and others dull finished. These different effects can be brought out clearly in

AFTER acquiring knowledge of the various types of finish available, the manufacturer of metal parts still has the problem of successfully adapting some one finish to a given product.

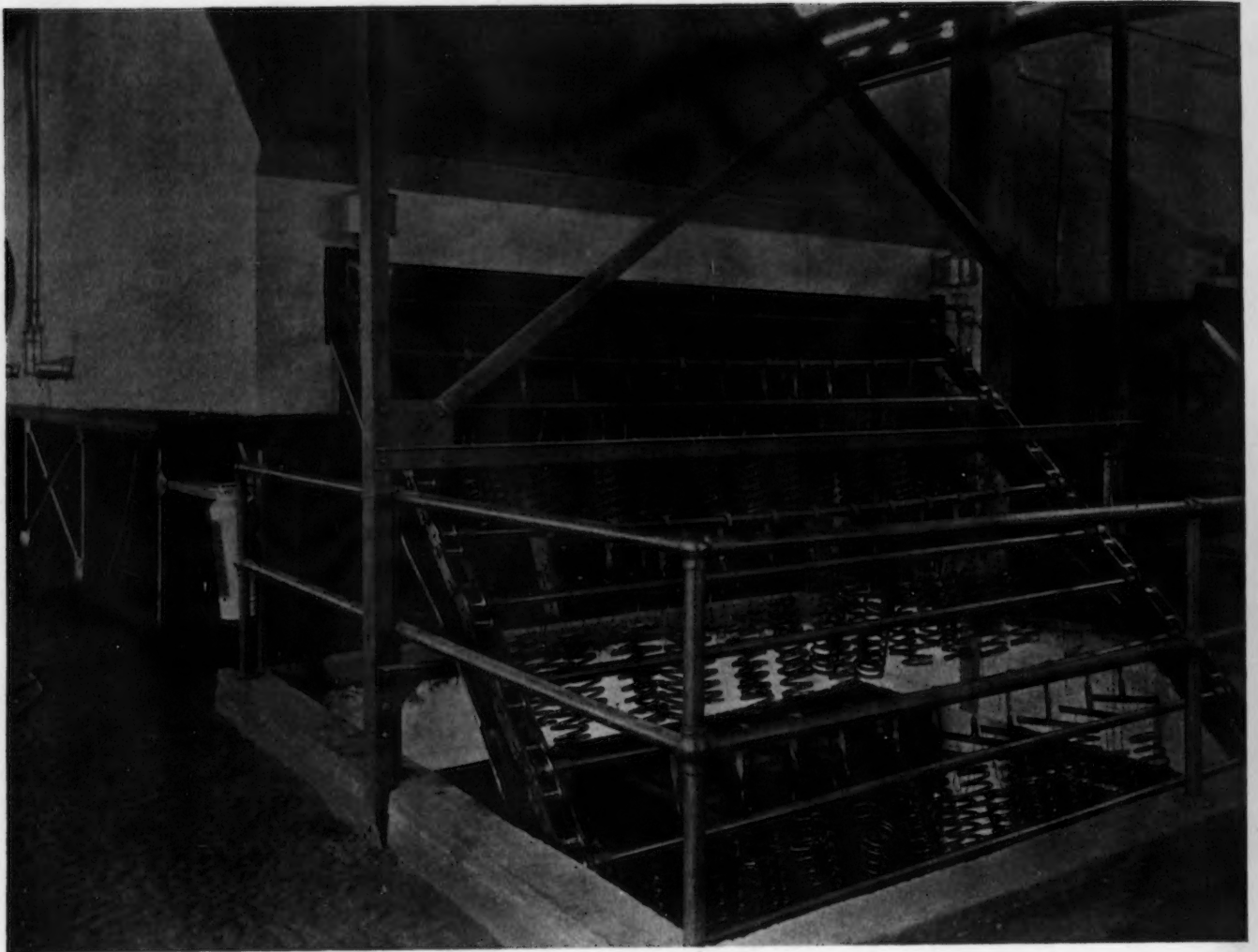
This article describes practical experience in finishing the following diversified items: Golf club heads, bolts and nuts, automobile coil springs, steel beer kegs, and structural aluminum.

the chromium tank, provided the previous polishing has been done correctly.

"Of course with all this it is necessary to stay within a predetermined cost range. To be sure that our polishing operations are not too expensive, we must know that we are getting a maximum number of pieces per set-up of each wheel. Some of the things to watch carefully in this connection are:

- "1.—A good quality of glue must be used. Even good glue can be spoiled by improper cooking, and by not holding it at an even temperature after it is cooked.
- "2.—The wheel must be warm enough so that it will not chill the glue.
- "3.—The abrasive grain must also be held at a correct temperature so that it will imbed itself into the glue to produce proper adherence and not merely lay on the surface where it will rub off when in contact with the work.
- "4.—The wheel must be properly cured after the glue and emery have been applied, and this calls for controlled atmospheric conditions.
- "5.—Size and uniformity of the abrasive must be carefully guarded. If different grades become mixed, trouble is ahead, as even a small amount of coarse abrasive accidentally falling into a bin of finer grade may cause many hours to correct the trouble on the polishing floor.
- "6.—Balance of the polishing wheel is highly important. Poorly balanced wheels will surely put a crimp in the costs in the polishing department.

"The above refers to set-up polishing wheels. In finishing golf club heads we sometimes use felt wheels and wire brush wheels, and in some



An elaborate handling system facilitates the finishing of Buick coil springs. The springs coming out of the enamel baking oven are shown in the view above.



Part of the golf club head polishing room at the Burke plant.



cases we merely dip parts in acid after they come from the tumbling barrels.

"It is next to impossible to give any set rules covering all details of the various tools and materials used in polishing. Each manufacturer will develop his own best specifications by constantly experimenting. We have found, for instance, that a grease stick costing 40c. a lb. is more economical for some of our operations than one costing 10c. a lb.

"Cleaning after polishing and buf-

of the features may be of interest as typical of modern finishing practice in this particular field.

Raw material for most of the products at the plant consists of rods in coils received in carload lots from the steel mills. Various steels are used to meet different specifications, but one typical steel is S.A.E. 2330. The railroad cars are backed into a shed and are unloaded on to buggies resting on narrow gage track which extends into the building and alongside the first cleaning tanks. This track is slightly

vided with supports holding them above the ground so that they may be picked up by lift trucks. They also have hooks which make it possible for them to be carried by overhead crane.

Parts Washed and Dried Automatically

At the washing machine a hoist picks up the containers and dumps them into a hopper from which they are fed into the machine and, first, thoroughly washed in an alkaline solution held at 222 deg. F. This solu-



Racks, holding 24 golf club heads each, speed up production through the cleaning and plating operations.

ting is also an important problem. With some greases buffed products should be dropped into a cleaner immediately after coming from the wheel, and if this is not done, the residual compounds will harden and cake and become very difficult to remove. Other greases may so closely adhere to the pores of the metal that special cleaning operations become necessary before chromium plating."

Finishing Bolts and Nuts

At the plant of the Russell, Burd-sall & Ward Bolt & Nut Co., Port Chester, N. Y., bolts and nuts are cadmium plated, parkerized, or galvanized, and the various processes involved have been standardized and placed on a production basis. Some

inclined so that the loaded buggies travel by gravity. All of the rods are dipped into acid tanks, then washed, and finally lime coated before being welded end to end into 4000-lb. bundles preparatory to wire drawing.

The different processing operations are highly ingenious and nearly all are automatic. Wire, for example, is fed through an automatic sequence which has as its end product a complete headed and threaded machine bolt. After fabrication all small parts are put through an elaborate washing machine designed and built by the company. The parts reach this machine in steel containers of a design developed at the plant as standard for nearly all material handling processes. The containers are pro-

tion is heated in vats in the basement below the machine and is circulated by pumps.

From the cleaning stage the parts pass automatically into a rotating drying drum which is heated by an oil-fired furnace. They travel gradually through this drum, and are automatically dumped into containers, which, when filled, are removed by electric lift trucks. The capacity of this cleaning machine is about 2000 lb. of small parts an hour. The parts usually are 1½ in. or smaller.

Larger parts are put through a belt-type washing machine which consists of a long belt loaded at one end and unloaded at the other and traversing at its central portion a cabinet in which the parts receive a pressure

shower of cleaning solution. In this case the solution is of a slightly different character and is held at 200 deg. F. instead of 222 deg. F. Drying in this case is a separate operation.

After preliminary washing, the bolts are inspected and then they usually pass directly to one of the three typical finishing operations. For cadmium plating, bolts from the standard size containers are dumped into perforated aluminum alloy baskets in which they are immersed first into an acid tank, then into an alkali tank, then into cold water, and finally into a cadmium plating barrel of horizontal type. This barrel is made of bakelite and revolves in a cyanide solution which carries the plating metal from cadmium anodes to the work.

The capacity of barrels used in this process is about 250 lb., and the coating of one load takes about 20 min. This is for the usual depth of cadmium plate, which is 0.0002 in. thick. Tests under the standard salt spray show this coating to stand from 60 to 100 hr. Where heavier coatings are desired, a thickness of 0.0004 in. is used and with this the life under the salt spray ranges from 600 to 800 hr. After coming from the cadmium plating tank, the parts are washed in cold water, then dried and then delivered to small containers from which they pass through inspection to the packing and shipping room.

Hot Galvanizing Sequence

For hot galvanizing the sequence is somewhat similar, although after the acid dip and washing, the bolts must be thoroughly dried to avoid spatter-

ing when submerged in the zinc. A 10-ton steel tank heated by an under-fired oil furnace is used for holding the zinc bath which consists of pure zinc kept to a designated level by frequent additions. The parts to be galvanized are placed in perforated steel baskets containing about 30 lb. each and are handled to and from the tank by an overhead trolley conveyor. The temperature of the bath is 850 deg. F. and the baskets are left submerged about 30 min., after which they are lifted up, one at a time, and set into a Watrous centrifugal machine which throws off the excess zinc. At this point the parts are sprinkled with a sal ammoniac solution, after which they pass through a shaker to a cold water bath, the purpose of the shaker being to distribute the solution.

For parkerizing, bolts are first acid dipped and washed, and then, in steel barrels containing from 250 to 300 lb., they are submerged in the parkerizing solution and are rotated from 1 to 1½ hr., depending upon the size and nature of the parts. After this they pass automatically into a combination washer, dyeing and drying machine, all mounted and rotated on the same shaft. A black dye is used, as otherwise the parkerizing process gives a mottled appearance. After the drying, the bolts are coated either with wax or linseed oil. Wax, which formerly was popular for this particular operation is now rapidly giving way to linseed oil. In cases where customers object to the slight oiliness of parts thus treated, the surface is dried by baking, which process does not appreciably reduce the corrosion resistance.

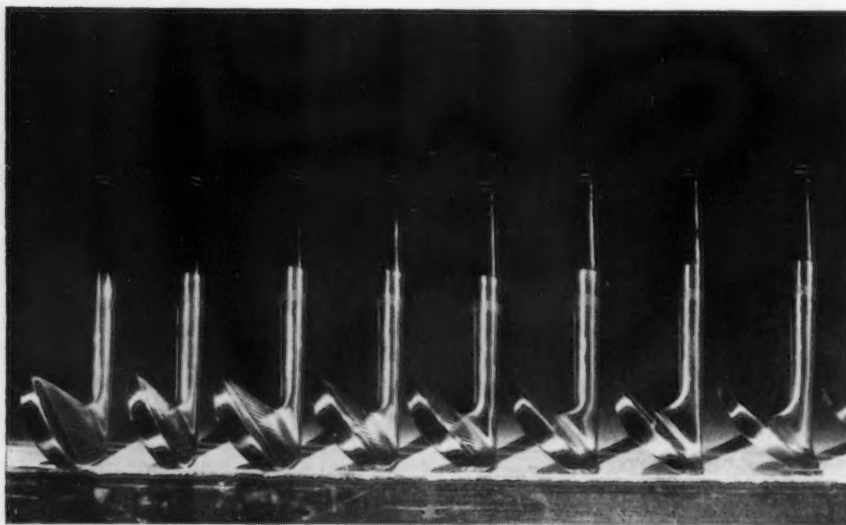
The finishing of the coil springs used in connection with the new de-

sign of the front wheel support of Buick cars presented such a difficult problem that even specialists refused to bid. The problem was finally solved in the Buick company's own plant.

As soon as the completely formed springs emerge from the forge plant they are placed on an overhead chain conveyor, four springs to each hook. The conveyor is designed with three hooks on each bar and with a space of 4 ft. between the bars. The loading of the conveyor forms the start of a continuous operation which cleans and dries the springs in preparation for enameling. The conveyor travels successively through the following sequence:

- 1.—Alkali clean—spray type washer.
Time 1 min. Temperature 150 deg. F.
Solution ½ to ¾ oz. sodium metasilicate per gal. of water.
- 2.—Water rinse—spray type.
Time ¾ min. Temperature 120 deg. F.
- 3.—Water rinse—spray type.
Time ¾ min. Temperature 80 deg. F.
- 4.—Bonderite.
Time 4½ min. Temperature 208 deg. F.
Solution 17 points.
- 5.—Hot water rinse.
Time ¼ min. Temperature 190 deg. F.
- 6.—Dry—gas oven, open-flame type.
Time 5 min. Temperature 350 deg. F.

After this sequence has been completed, the clean dry springs are transferred to another conveyor which carries them through the enameling and baking operation. The oven is a gas-fired tunnel type unit, and this second conveyor travels at a speed of 28½ in. per min. and holds on each of its crossbars 14 of the springs. The first operation is dipping into an enamel tank containing 4500 gal. of rubber fender enamel. The dipping time for each unit is 9 min., and this is followed by a dripping time of 9 min. The springs now enter the baking oven which they traverse in 22 min. The oven is maintained at a temperature of 460 deg. F. and the springs emerge with a finish enamel coat thoroughly baked and of a character to resist cracking under the action of the springs. The final operation is marking the springs with a special air dry enamel in different colors for the purpose of identification. This is done at the time they are inspected and loaded on to a rack platform which serves as storage space until



A high polish on golf clubs is always associated with quality. (Courtesy Burke Golf Co.)



The assembled golf clubs are carefully checked in this final inspection room, the finish of all metal parts receiving careful attention.

they are used at the Buick assembly line.

Steel Beer Kegs

The Fedders Mfg. Co., Buffalo, puts its steel beer kegs through a bonderizing process preparatory to finishing. This has been found to be an excellent preparation for the pitch lining on the inside as well as for the lacquering on the outside. Manufacture of these steel kegs is basically a deep drawing and welding job. When the stampings come from the press they are covered with a drawing compound. This is removed in a boiling alkali solution followed by thorough rinsing in boiling water. After this, the parts are assembled by electric welding and the complete assembly is again cleaned inside and outside with special solutions to remove any tarnish resulting from the assembly sequence. The barrels are again rinsed immediately before entering the bonderizing tanks, which operation consists of immersion for 5 min. in the prepared solution which is held at a temperature of 210 deg. F. A thorough rinsing with water also at 210 deg. F. follows. The insides are rinsed by a pressure jet and the outsides by immersion. The barrels are then dried with dehydrated air and immediately afterward are coated with pitch on the inside in the same manner and with the same equipment used in pitching wooden kegs. They are then carried by an overhead conveyor to the paint spray room where they are suspended on rotating jigs while two men with spray guns apply the lacquer.

Painting Aluminum

Some time ago the Smithfield Street Bridge in Pittsburgh was remodeled, using aluminum alloy shapes and members for the floor construction in order to increase the load capacity. This somewhat unusual structural aluminum raised a point as

to the proper method of finishing. The Watson-Standard Co., Pittsburgh, developed a special primer for use on this particular alloy. The company states: "The new aluminum shapes

received a shop coat of zinc chromate primer and then two finishing coats of aluminum paint. For both the primer and finishing coats a bakelite synthetic resin vehicle was used."

Editor's Note: This is a series of observations which, strangely enough, are exactly what they purport to be. In other words, they come from the daily diary of a real boss; a prominent executive in the metal-working industry who prefers to remain an anonymous author.

The Boss's Diary

I wonder who is going to be the most thankful man in the United States on Thanksgiving Day. Whoever he is, I'll bet it won't be because of his riches or possessions. These alone have seldom brought happiness. He probably won't be the most powerful potentate in the land nor indeed any of the vast number upon whom the mantle of responsibility has fallen. Shakespeare says, "Uneasy lies the head that wears a crown." It is doubtful that he will even be the healthiest of our race, for an ancient seer truthfully wrote, "Man shall not live by bread alone." Probably he won't be a world-renowned victor—for with every victor there must be a loser.

No, I've a hunch that the most thankful man will have known bitter want and escaped it. He may have mishandled responsibility and learned better. He may have known pain and physical misery and been cured of it. He may have conquered the world's worst foe—himself. If, to such a man, realization of the adversities he has overcome and escaped from comes at Thanksgiving time, we may consider him as a promising candidate for the honor of being the most thankful man.

Seasonal Changes In Machine

INTERESTING changes in seasonal purchases of machine tools are graphically shown by charts recorded by The E. L. Essley Machinery Co., Chicago. Monthly averages of orders clearly show changes in the character of the market, changing methods of buying and the effects that rapidly growing major industries exert when they enter a market in a large way.

Chart No. 1 consists of four lines, each being located by monthly averages. One line presents averages for the ten years from 1910 to 1920. The second line shows the averages from 1920 to 1930. The third line shows the 1925 to 1930 average. The fourth line, which is the 20-year average from 1910 to 1930, clearly shows that important changes which occurred from 1920 to 1930 offset trends in the previous 10 years, thereby forcing the 20-year line to follow in a general way the trend of the 1920 to 1930 period.

By following through the 1910-1920 curve it will be noted that there was a moderate pick-up in orders in February, followed by a drop in March and then a moderate upward trend in April, followed by a low in June and then a gradual climb through September. October and November were fairly steady, but there was a drop throughout December.

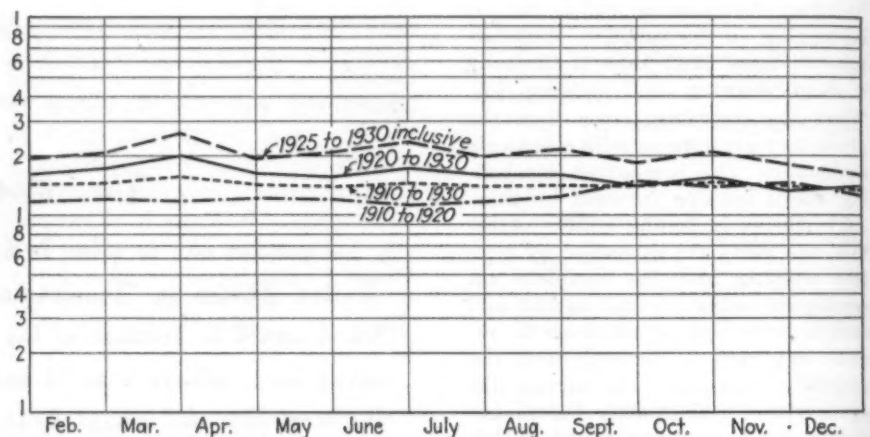
Causes of the Changes

Now, then, study the 1920-1930 curve. Orders started to rise in January and reached a peak in March, at which time in the previous 10 years orders were receding. Then followed a sharp decline to May, when the curve tended to flatten out. June, contrary to the 1910-1920 period, witnessed an increase in orders, and then through July, August and September orders slowly receded as a contrary movement to the 1910-1920 curve. A moderate pick-up in October was followed by a drop in November and then followed another pick-up to the end of the year, all of which was con-

trary to events in the previous 10 years.

What has brought about these changes? From 1920 on, a rapidly increasing number of concerns started to budget expenditures. Near the close of a year some large buyers study machine tool requirements, with the result that early in the new year

tion with regard to March and April, which take first place. At the same time the early summer has been lifted out of the doldrums. From 1920 to 1930 orders in December climbed as the result of the growing practice to clean up old business by the end of the year. As a general thing, December bookings are, by comparison,



No. 1—New large industries and the budget method of providing for purchases have brought about material changes in seasonal activities.

programs are quickly whipped into shape. This results in heavy commitments being placed early in the year rather than stringing purchases throughout most of the year. Also, as time has progressed there have been more and more large concerns in the market which could and would buy large requirements at one time.

The result is that March no longer represents a low for the first half of the year, but actually becomes the peak month. Railroads are usually a trifle slower than other industries in reaching the buying stage, so their purchases on budget tend to retard the drop in the late spring and actually contribute materially to the up-turn in summer business.

The effect of heavy list buying in the spring is to take away a part of the former fall buying, thereby relegating the fall to a secondary posi-

low, whereas shipments (not shown by the curves) are always high.

Farm Equipment a Factor

Another determining factor in the 1920-1930 curve was the entrance into the market in a large way of farm equipment builders. Their orders for machine tools usually are placed in the first six or seven months of the year in anticipation of manufacturing requirements as dictated by fall production schedules.

The average, 1910 to 1930, shows a spring peak brought about by the changed conditions of 1920-1930. The 1925 to 1930 average shows the characteristic March rise in bookings which were greatly influenced by farm implement manufacturers' purchases. The hump in June reflects the practice of railroad buying. There is

Tool Demand

By ROGERS A. FISKE
Western Editor, The Iron Age

a decided downward slope to the 1925 to 1930 line during the two closing months of the year.

The Downward Trend

Chart No. 2 shows booked orders, shipped orders and unfilled orders from 1929 to August, 1934. It shows the downward trend in business from June, 1929, to July, 1932, when an upturn occurred which was interrupted at the time of the bank moratorium (March, 1933), after which it again resumed its upward trend. These curves show the lag between booked orders and unfilled orders. There is also an interesting relation between booked and shipped orders. Up through June, 1929, shipments were below bookings, but after that period the relation of the curves was reversed, indicating that costs were mounting, thereby giving a key to the necessity of economies needed should the relation continue for any length of time. In other words, when shipped orders exceed booked orders the unfilled order curve drops and it behooves the seller to search out the

SALES RECORDS extending back to 1910 have enabled the E. L. Essley Machinery Co., Chicago, to make a careful and accurate study in the seasonal demand for machine tools. Some of the results of this study are presented in this article.

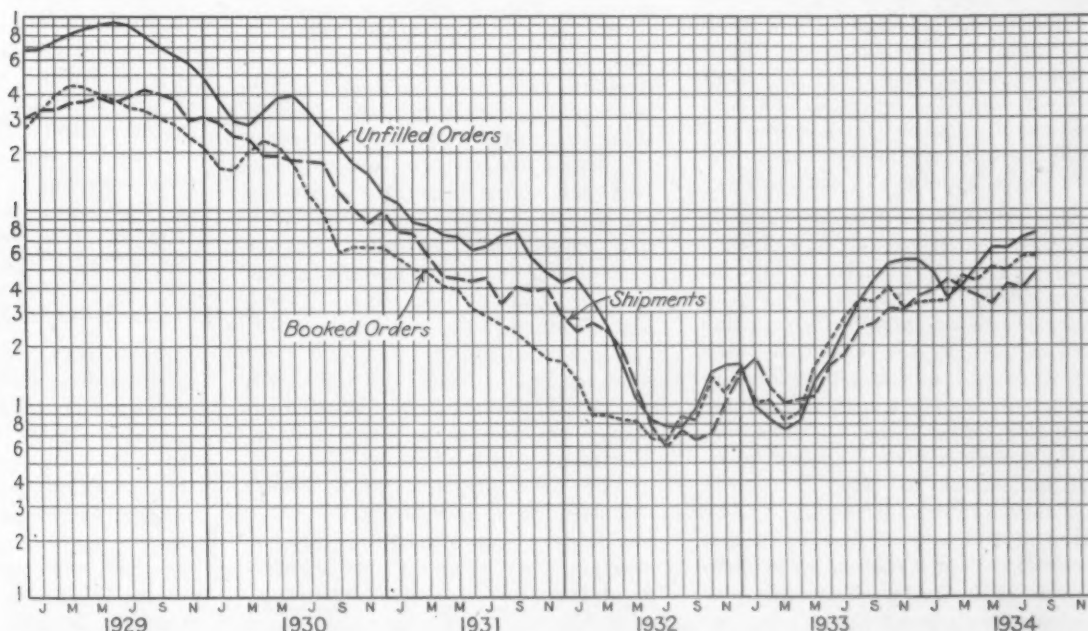
reasons and take corrective steps, whether they lie in the direction of economies of operation, practices and efforts of selling or a closer study and analysis of the merchandise offered in relation to the products sold by competitors. This chart also clearly shows the efforts of factories to rush out orders in the last month of the year. In each year, except in 1931, December shipments recorded a sharp rise.

Another thought arises from study of this curve. Whenever the shipment line goes above the bookings line and

stays there for three consecutive months, it gives indication that business conditions are changing and thereby a signal that a variable compensation plan could be based on the relation between these two curves. Such a plan would automatically adjust itself with the business trend. It would respond quickly to changes and might readily prove to be far more satisfactory than the usually lagging process of cutting and raising salaries as business changes take place.

Westinghouse Electric & Mfg. Co., East Pittsburgh, in the quarter ended Sept. 30, had net loss of \$332,062, compared with net loss of \$1,513,645 in the same period last year. For the first nine months of this year net loss totaled \$363,787, against net loss of \$7,083,641 in the first nine months of 1933. Orders received during the nine months ended Sept. 30, 1934, totaled \$79,105,881 compared with \$52,953,482 in the corresponding period of 1933, an increase of 49 per cent.

No. 2—The relationship between booked orders, shipments and unfilled orders gives indication of market drift and opens the way to study corrective measures.



Advocates Revolutionary Changes

REVOLUTIONARY changes in methods of making iron and steel are here proposed. The blast furnace would use oxygen instead of air and the molten pig iron would be received in a continuous stream. The open-hearth furnace would be replaced by, say, a shaft furnace in which molten pig iron and molten scrap, each brought to it independently, would be mixed with a counter current of oxidizing slag and from which a continuous supply of steel would be delivered. The issuing steel would take the form of an endless casting of small section for finishing in the rolling mill, doing away with the blooming mill.

In making out his case, the author levels numerous strictures against the industry, some of which are calculated to lead to searching examination of current practices no matter how long followed. As a chemical engineer and from a position outside the industry, he finds that steelmaking, though a chemical process, has not gone along with other chemical industries in breaking away from the batch idea to that of continuous output and that it has not been eminently successful in effecting the thermal economies possible.

He estimates that an expenditure for development work of \$5,000,000 a year over a period of 10 years, or \$50,000,000 in all, would bring results that in turn would mean a saving of \$5 a ton, or enough to return the investment annually with a production of only 10,000,000 tons a year.

It will be interesting to note the reaction to the author's challenging analysis. In the discussion likely to follow the spotlight may be turned on a variety and scope of improvements now under consideration to an extent beyond general belief.

A STARTLING arraignment of the iron and steel industry has been made by a chemical engineer. It is a charge that not for 75 years has there been a significant change in either the theory or fundamental design of equipment. But accompanying the indictment is a proposal that the industry break away from tradition and approach the manufacturing processes along paths paralleling those taken in recent years by other industries.

The challenger is Charles F. Ramseyer, research engineer, Chicago District Electric Generating Corp'n. His accusation takes the form of a paper presented through its iron and steel division to the American Institute of Mining and Metallurgical Engineers. The paper is scheduled for discussion at the New York meeting of the society in February next year, and indications are that there will be considerable discussion. The paper in full is published in *Metals Technology*, for October, a publication of the Institute. From this pre-printing is offered the following

rather extended review of how Mr. Ramseyer looks at the steel industry and what he believes it should do to improve its technological and economic status.

Underlying the author's discussion is the thought that in this period of seven score years or so process industries have been born and developed and others completely revolutionized while the primary processes of making iron and steel are still carried out along lines laid down by Bessemer and Siemens and Martin and subsequently expanded in the 1880's and 1890's to practically the modern scale by Carnegie, Schwab and Capt. Bill Jones. He explains the condition of the iron and steel industry in this wise: By the beginning of the twentieth century the industry had grown so large that no one man's interest in its technical development was sufficient to divert attention very far from the main business in hand, namely, that of making money "for its new owners, or at least for its controlling groups of financiers." "The general policy

of the industry," he adds, "seemed to be to make as much money as possible, with as little risk as possible, and in this 'direct' pursuit of profit the search for improved processes languished."

Continuing in this vein, Mr. Ramseyer writes: "Changes were almost entirely confined to minor improvements in construction and the routine details of operation along lines already laid down. Such new things as there might be were either still-born or died of exposure before they had gained strength. With the growth of the country and the demand for steel, plants grew larger to conform to the size of the units in them, electricity was substituted for steam; and in mechanical ways, especially in the handling of material, a field in which America excels the world, the industry grew more efficient; but its process equipment remained fundamentally the same in design as it had been for two generations."

Also: "While the oil industry went from batch to continuous processes and cut refining costs in two, steel continued to be made in the old-fashioned way, increasingly in the open hearth." He regards the open-hearth as a batch furnace "akin in principle to heating water by first pouring it into a saucer and then holding a candle flame close to its surface, except that with steel the additional precaution is taken of carefully covering it with a nice thick layer of slag, which effectively protects it from taking up heat efficiently."

Causes for Lack of Development

As among the reasons that the steel industry failed to continue its early prodigious strides in process development, Mr. Ramseyer observes that "its long hours and hard life perhaps kept some of the more imaginative young engineers from its plants. Operating executives of exceptional intelligence and ability who rose to be officers of their companies were usually quick to see upon arriv-

In Steel-Making Process

ing in New York that they could make much more money in Wall Street than they could ever hope to obtain by developing new and better methods of making steel for their companies. The continued growth of the country and its demand for steel supplied sufficient profits so that competition was not too keen and there was no great urge to do much better.

"The non-technical bankers, lawyers and financiers at the heads of the larger companies were against spending large sums on dubious experiments, and when they did attempt some experimentation they were frequently ill-advised and unsuccessful. From sad experience they learned how expensive high-temperature metallurgical development work could be, and they were loath to experiment in a field where millions were required to prove out new ideas. Their choice of operating executives naturally favored men who had made low cost records, generally by avoiding all experimental expenditures and sticking to proved methods and equipment, as good operating men should do. Perhaps, too, the tremendous investment in plant made them apprehensive of the financial dangers of sudden obsolescence.

"The more highly trained technical men with time to think became largely fascinated by the new alloy steels, to the exclusion of other interests, though such steels represented, and still do, but a small part of the total steel tonnage produced; and the plants continued to be run largely by the more conservative operating men along the old lines. Moreover, no one of the larger companies was wholly owned and controlled by a single individual or small group, and

none, even though it had the initiative and resources, could spend money on a large-scale process development without having to listen to the demands of its stockholders for dividends."

Would Have Continuous Delivery From Blast Furnace

The blast furnace, Chemical-Engineer Ramseyer holds, should deliver molten iron continuously and instead of the blast being air, a supply of oxygen should be given it instead. His favorable comments on the blast furnace are that the handling of materials is well worked out and that it is thermally the most efficient of all steel-plant furnaces, in that it employs the technically sound principle of the counter-current utilization of both heat and materials.

The first anomaly in blast furnace operation, as he sees it, is that "despite a complete unanimity of opinion among blast-furnace men that the secret of successful operation is uniformity and regularity in the flow of materials to and from the furnace, no attempt has been made to remove the iron and slag from the furnace continuously. The water that collects in the blast-furnace gas mains drains itself off continually through water seals, but no effort to remove the molten iron from the furnace similarly through a liquid 'iron seal' has been made, though the advantages of such a constant knowledge of the quality of the product would be manifold.

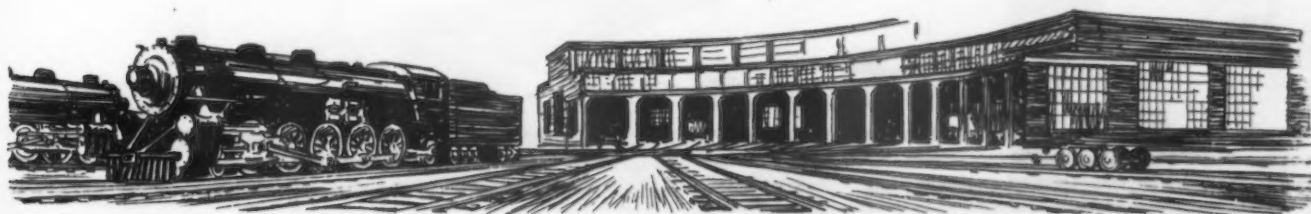
"Large sums are spent on the construction of huge regenerative checker chambers, called blast-furnace stoves, of which each furnace usually has

three or four, for preheating the air blast of the furnace, and yet ordinarily they are run far below capacity in order to have available at all times a reserve of heat to be used in case of need to control the temperature in the lower part of the furnace. Would it not be more sensible to use these expensive pieces of equipment at their highest efficiency and capacity at all times, and control the furnace temperature by adding a little extra heat directly to the hearth in the form of additional fuel as required? Yet, no comprehensive experimental work is being done along this line, so far as is known, in this country.

Oxygen for Combustion

"Another and much larger field for development in blast-furnace work," continues the author, "is the use of oxygen instead of air for combustion. Much has been written on the subject, but very little done. The practical man usually has gone into it no further than to inquire whether equipment is available to produce the tremendous volume of oxygen required by a blast furnace, and how much it would cost, and upon finding the cost apparently prohibitive has dropped the subject. But it has many possibilities. For one thing, it would greatly increase the capacity of a given furnace, and since the steel code does not permit the building of new furnaces, this may turn out to be of importance for some growing company.

"It is not commonly realized that most of the present equipment could be used for oxygen without alteration by the recirculation of the top gas from the furnace with added oxygen



until all nitrogen was worked out of the system. The gas-engine generators and blowing engines running on a gas-oxygen mixture would exhaust at blast pressure into the blast mains, thus increasing the blowing capacity, and the oxygen would be added to the blast either before or afterward to form a blast gas containing solely carbon dioxide (instead of nitrogen) and oxygen. Furnace temperature would be controlled by varying this ratio, the stoves being run at capacity at all times. The top gas would have more than twice the heating value of the present blast-furnace gas, assuming the same ratio of carbon monoxide to carbon dioxide, thus providing all the heating gas necessary for all other operations of the steel plant. The energy-carrying capacity of all blast-furnace gas mains would likewise be doubled. Since the process outlined would entail primarily the substitution of carbon dioxide for nitrogen in the blast, the blast volumes and other conditions would not change radically, therefore most of the present equipment would continue in use.

"A proposal that offers so many advantages is well worth a searching and detailed study. The theoretical power required to produce oxygen from the air is low, and would be furnished in large measure by the present blowing engines, using the energy that now is required to compress the nitrogen in the air. Much development work would have to be done, especially on the oxygen end, but the steel companies can hardly expect the liquid-air companies to do it without more encouragement than they have received heretofore.

Another and increasingly troublesome problem with most blast-furnace plants, especially those close to urban centers, is the disposal of the slag, of which from $\frac{1}{2}$ to 1 ton or more accompanies the production of each ton of pig iron. With the furnace temperatures available with the use of an oxygenated blast it should be possible to solve this problem, at least for many types of pig iron, by increasing the lime content of the slag to the point where it could be ground directly for the production of portland cement. The blast-furnace operating man will reply at once that

this cannot be done. But this has not been proved because no one has yet intelligently tackled the problem with adequate backing in a serious attempt to solve it. Development work cannot be done effectively by people with regular operating duties, as has long been recognized in our more profitable industries, but not as yet by most steel companies. If any such work is done at all in the steel plant, it is usually done by the department superintendents in their spare time."

Would Melt Scrap in Shaft Furnace

Turning to the open-hearth department, the author points out that the objects of the open-hearth are: (1) melting, (2) treating the molten mass with a purifying liquid—the slag, and (3) finally separating the two.

"It accomplishes these objects by blowing down a flame on top of the metal to melt it and the slag materials, and then allowing the slag that is lying on top of the molten metal to react slowly with it. The minute nonmetallic (slag) impurities in the metal rise slowly to the top, being lighter than the steel (just as dirt slowly settles out of muddied water).

"This inefficient method of heating two substances and letting them react without any positive method of mixing them, or of separating them after the reactions are complete, keeps even the best open-hearth furnaces from melting more than 300 tons or so of steel in a day, at a thermal efficiency of 10 to 15 per cent, while a blast-furnace can develop three or four times as much heat with an efficiency fourfold to fivefold greater. The fundamental difference is that a shaft furnace—such as a blast furnace—operates both thermally and chemically on the countercurrent principle, while an open-hearth furnace is but a batch kettle, and an extremely inefficient one in the bargain."

There is no intrinsic reason, in Mr. Ramseyer's opinion, why steel scrap should not be melted in an oxidizing blast-furnace fired with oil or pulverized fuel, whereby the tremendous advantage of using a shaft furnace would be obtained. "A single furnace of that kind the size of a normal blast furnace would have a scrap-melting capacity equivalent to a score

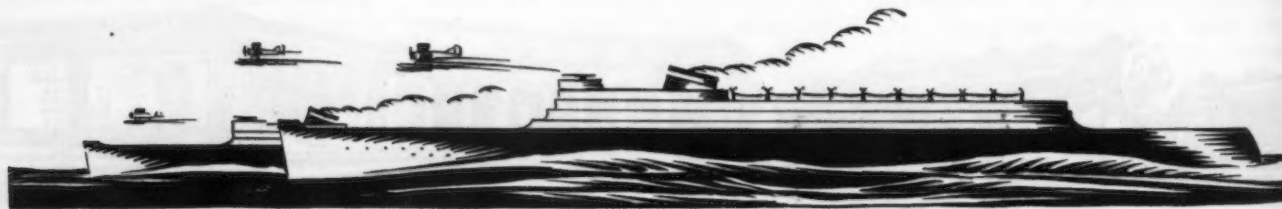
of open-hearth furnaces, and it should cost only two or three times as much as one of the latter. Whole automobiles could be run into the top of such a furnace without any pressing or scrap-baling operation, and run out at the bottom a few hours later in the form of liquid steel scrap ready to be converted into high-grade steel, either by mixing and refining with molten pig iron or with carbon by itself. This would dispose of the first function of the open-hearth furnace—the melting of the scrap.

Suggests Shaft Furnace for Melting Oxidizing Slag

"The second major function in steel-making that takes place in the open-hearth furnace is the oxidizing of the impurities of the charge and their elimination by absorption in the slag. As a means of forwarding the chemical reaction between the two materials by mixing, it would be hard to devise a more inefficient apparatus than the open hearth. In the first place, the metal must be kept molten by the heat from the flame, which can only reach it by passage through the slag, which is more of a heat insulator than a conductor; in the second, instead of the two reacting substances being intimately mixed in a state of violent agitation, as they should be, one lies more or less quietly on top of the other, the only contact between them being the single flat and relatively quiet interface.

"At the temperature of molten steel, the purifying reactions between slag and metal are almost instantaneous if the slag and metal are brought properly into contact with each other; but no use is made of this well-known fact. The open-hearth takes hours to do what the bessemer, by intimate mixing and violent agitation, does in 10 min. There is no fundamental reason why the oxidizing basic open-hearth reaction between slag and metal should not be similarly speeded up; nor, to go a step farther, is there any reason why the bessemer process, which is a great improvement as far as it goes, should not be made continuous instead of intermittent.

"We have already seen that the steel-scrap melting function of the open-hearth may be performed with quadrupled economy in an oxidizing



shaft blast furnace. Why not do the same thing for the slag, either in the same shaft with the scrap or in a separate smaller slag-melting, oxidizing shaft furnace? Here again there would be the advantage of the vastly greater thermal efficiency of continuous shaft melting as compared with batch heating.

Mixing and Separation by a Continuous Process

"With molten steel scrap, molten pig iron and molten basic oxidizing slag at hand, all produced continuously and uniformly at a constant predetermined rate in the most efficient possible manner, all that is left to do is to devise equipment that will mix the three together thoroughly, allow them to react, and then separate the mixture, in order to produce steel with but a fraction of the heat, capital investment and labor required by the conventional open-hearth process. The mixing of the three must be carried out continuously, not by any batch process; but this does not seem very difficult in view of the fact that molten steel is two or three times as heavy as molten slag.

"It certainly should not be impossible to devise a slag tower or column through which to drop the steel in a finely divided state, and to collect the metal at the bottom. This has already been done in part by Aston in his brilliant and revolutionary process for the production of wrought iron, which is now in actual commercial operation—the sole significant development in ferrous metallurgy since the Civil War! The purifying-column process should be carried on in a counter-current manner, after the best practice of the chemical process industries; the nearly used-up slag meeting the most impure metal, while the nearly purified metal finally separates from the freshest slag. This would have the great advantage of decreasing the amount of slag necessary per ton of steel, and in the basic process would raise the phosphorus content of the spent slag high enough to enable its sale as a fertilizer, as is done with basic bessemer (Thomas) slag abroad.

"We now have a chemically purified steel, continuously produced, with the

utmost regard for economy of fuel and materials, simply by utilizing the known efficiency of shaft furnaces and the counter-current treatment of the hot molten steel-pig mixture as it falls through a rising column of slag. The only function of the open-hearth furnace not discussed is the elimination of the non-metallic impurities; i.e., oxides or 'dirt' left in the steel, which will necessarily be left over from the rapid and efficient, though violent processing to which we have subjected our steel.

"The elimination of the dirt should not be difficult if we do not allow ourselves to be bound by the limitations of conventional practice. What do other industries do when they have a liquid contaminated by small amounts of other non-miscible liquids or solids? The filter press is out of the question; the particles are too finely divided and there are no materials of which to construct a filter. But what of the separation of milk and cream or water and oil? They differ in density by very small percentages, while the dirt in steel is less than one-half as heavy as the metal in which it is suspended. With this advantage of a much greater difference in density, the centrifugal separation of the steel from its suspended impurities should be simplified. All that is needed is some man of the caliber of Capt. Bill Jones, and the deed will be as good as done—and probably made into a continuous process as well. Has any steel company ever seriously (to the extent of a million dollars) proposed a joint investigation for the development of such a machine to a leading manufacturer of centrifugal separators? We doubt it.

"There are other treatments that might well be applied to steel; for example, passing it through a reducing slag to further purify it, and subjecting it to a vacuum to draw off the dissolved gases, which frequently cause a lack of soundness (blowholes) in the final product. This development has already taken place on a small scale in some countries, and the outsider marvels that more has not been done with it. A number of simple methods of applying the principle in practice will immediately suggest themselves to almost anyone. If

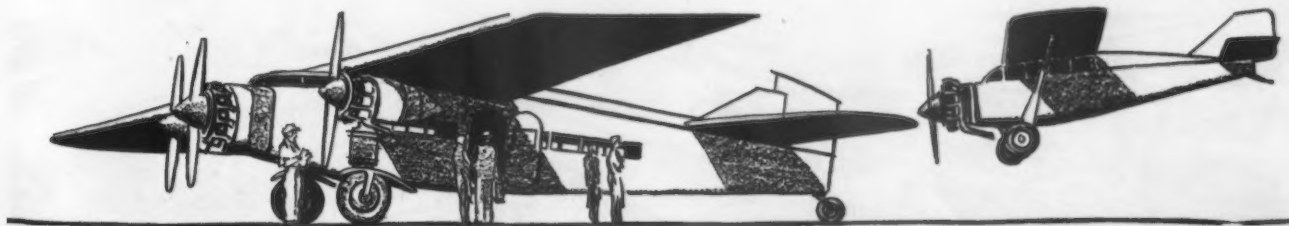
nothing better can be devised, let the whole casting process take place in a vacuum. Anyone familiar with the size of the huge vacuum chambers on the condensers of a large, modern steam turbine—big enough to hold a small cottage—can easily visualize such a process. This development may well be one of the first of the suggested possibilities to materialize. Even the 5000-year-old clay industry has started to vacuum-treat its raw material within the past few years."

In summing up this phase of the subject, the open-hearth furnace is described as "a most inefficient melting and mixing unit, and even as a settling chamber leaves much to be desired in the way of capacity. Too much time is required to let steel purify itself by just sitting still—no modern process industry would tolerate such a tedious method for a moment. So we may as well agree to its eventual abandonment. Such an irrational piece of equipment cannot hope to live forever merely because its builders and operators are too lazy to make a change. The change will be forced on them."

Would Do Away With Ingots

In the finishing mills the author finds little to quarrel with. The smaller shape and section mills, he asserts, are marvels of mechanical ingenuity, running almost automatically at tremendous speeds and high capacities. "But it is still possible to be critical about the turning of liquid into solid steel, accomplished by casting the molten metal into huge ingots which cool so slowly that the originally homogeneous liquid metal is far from homogeneous by the time it has solidified. . . . If Henry Ford could show the world how to make plate glass from a continuous stream of the molten raw material, is it not at least conceivable that the same thing could be done with steel?"

"A vastly different technique might be required, to be sure, but there is no reason to believe that insuperable obstacles would be encountered. It is purely a problem in mechanics, materials and the flow of heat, and without question would yield to an intelligent attack. Ten years? Perhaps, but that is a short time to spend



on a process capable of producing such tremendous savings. Nor need we limit ourselves to the continuous formation of steel plates. All small shapes and reasonably thin sections, up to an inch or so in thickness, should be amenable to continuous casting treatment. With the metals of lower melting points satisfactory experimental results have already been obtained.

"Let us hope that some day the blooming mill will be relegated to rolling finished heavy products and be no longer retained as a means of partly correcting the defects inherent in the present process of casting steel into ingots. To pour homogeneous molten steel into huge ingots only to roll them down again into smaller pieces containing imperfections, of which most can be traced back to the casting and freezing of the ingot, is absurd."

Cost of Research and Its Rewards

Ramseyer would not hold all "this stagnation in process development" against those in control of the steel companies of the world. High-temperature experimental and development work on a large scale, he points out, is extremely expensive. "Small-scale operation is not easily possible with molten materials that solidify in an instant when anything goes wrong, so that units at least half the usual size must be built if one is to proceed with any assurance of success. For every \$100,000 spent on the trial of chemical processes on a semi-commercial scale (and there are many) \$1,000,000 might easily be required in the high-temperature field. Sums of this magnitude are not available for experimental work by any but the largest companies, which more often than not are quite content to let someone else do the pioneering. . . .

"No one can deny that the research staffs of the steel companies have turned out a vast amount of good fundamental theoretical work, but little of it has ever been applied to the development of practical equipment problems. Special steels, forming but a small percentage of their total output, tend to be studied to the exclusion of any new process de-

velopment work on the production of the ordinary tonnage steels, which constitute nine-tenths of their total manufactures and on which a saving of a dollar a ton would yield truly fabulous returns."

Outlines an Ideal Plant

In conclusion, the author touches at some length on an ideal plant. "We will start with two blast-furnaces, making 2000 tons of pig iron and 1000 tons of portland cement clinker per day, besides supplying gas for all other heating purposes. Add to this a small oxidizing shaft furnace for melting 2000 tons of miscellaneous scrap a day—'heavy melting scrap' would have no special significance for such a furnace. Add also a still smaller one melting 100 tons of oxidizing slag, sold for the fertilizer value of the phosphorus it has taken out of the pig iron.

"The molten steel scrap and pig thus produced will be fed continuously down through a rising body of the oxidizing slag and drawn off through a liquid metal seal at the bottom for centrifugal, vacuum, or other special treatment before going to the continuous-molten-to-solid-metal casting tank or mixer, from which the hot, solid, endless bar or shape issues and is rolled to size without the production of scrap. This is no wild phantasy. Half the details have already been worked out in other plants or processes, either for steel or other materials. To work out the rest of the problem would require merely time, money and technical imagination.

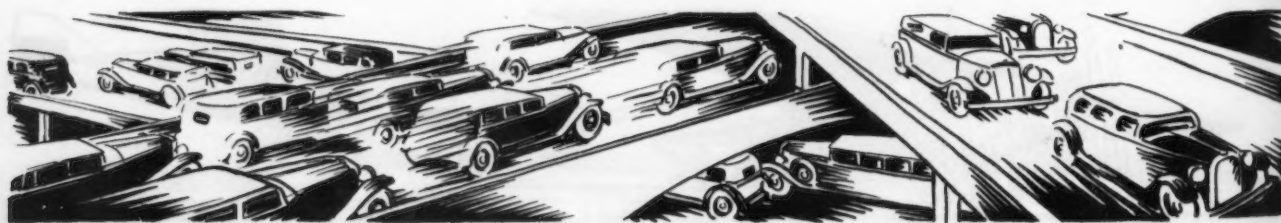
"In such a plant, the open-hearth shop would be replaced by an investment of less than half as much; ingots and blooming mills eliminated altogether; the production of mill scrap reduced by 90 per cent; one-third to one-half the present fuel requirements saved; not to mention a profit of a dollar or two a ton on the basic refining slag (fertilizer) and another dollar a ton on the blast-furnace slag (cement clinker). Such a plant, I believe, when smoothly functioning, would show a saving in the cost of steel of at least \$5 a ton.

"It can be done. The chemical process industries have demonstrated the

correctness of the fundamentals, and steel-making is essentially a chemical process. All that is required is the will and the money. Though development work on the whole project, when well under way, might easily cost \$5,000,000 a year over a period of 10 years, or a total expenditure of \$50,000,000, the saving at \$5 a ton in this country alone on a production of but 30,000,000 tons of steel per year would give an annual saving of \$150,000,000, or 300 per cent on the investment. This return from process development on the 'tonnage' steels is far greater than can possibly be realized from the special alloy-steel development and production-control work in which most steel-mill metallurgists are engaged at present. . . .

"Perhaps the only place where there is enough energy, enthusiasm and lack of respect for precedent to make such an undertaking possible is in the new and growing steel industry in Russia, destined some day, from the size of the country, the extent of its resources, and a constantly increasing demand, to be as great as our own steel industry has become under similar conditions during the past 75 years."

The third edition of "Industrial Furnaces" by W. Trinks, recently published by John Wiley & Sons, Inc., New York, contains the latest data of the science and practice of furnace building. About two-thirds of the book has been entirely rewritten, and an examination of this new volume shows a considerable quantity of research data which have been made available since the first edition. In this latest work, Professor Trinks points out that theory of industrial furnaces in order to be complete and to agree with practice must often be complicated in that secondary effects must be considered. However, use is made of tables, charts, and graphical methods to such an extent that the consideration of secondary effects in this new book neither presents difficulties nor requires additional time. The contents may be divided into five major divisions, namely: the heating capacities of furnaces, fuel economy of furnaces, heat-saving appliances in combustion furnaces, strength and durability of furnaces, and movement of gases in furnaces.



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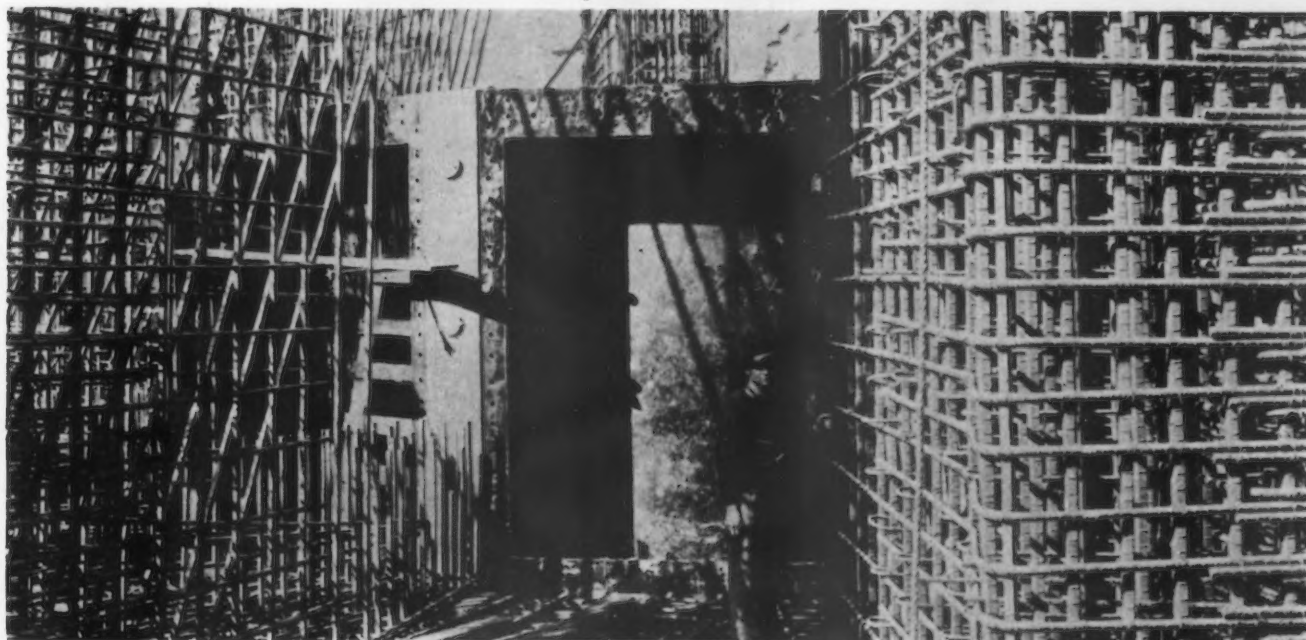
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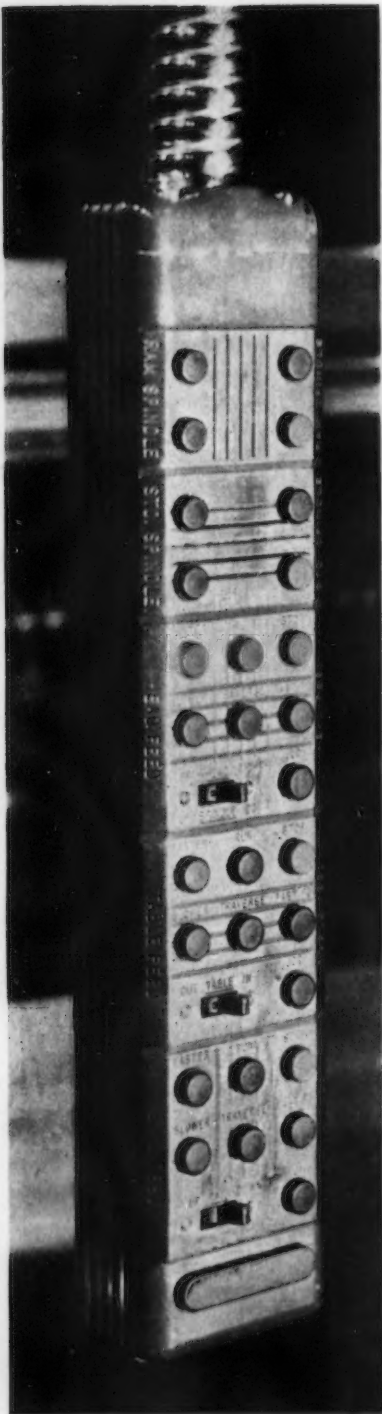
Steel At Work At the Hoover Dam

HERE is a group of photographs showing installation of the intake gates and towers at the Hoover Dam. Possibly they may be of interest to you, showing a large use of steel. There are four reinforced concrete towers, 342 ft. high and 32 ft. inside diameter, each of which contains two welded steel cylinder gates manufactured by Westinghouse.

The four towers required 14,700,000 lb. of reinforcing steel. This is equivalent to 158 lb. of reinforcing steel per cu. yd. of concrete. The eight welded steel cylinder gates and nose liner, assemblies which have a total weight of over 3,100,000 lb. control the flow of water into the towers. At full capacity they can pass 120,000 cu. ft. of water per sec., the potential energy of which is equivalent to 8,000,000 horsepower.

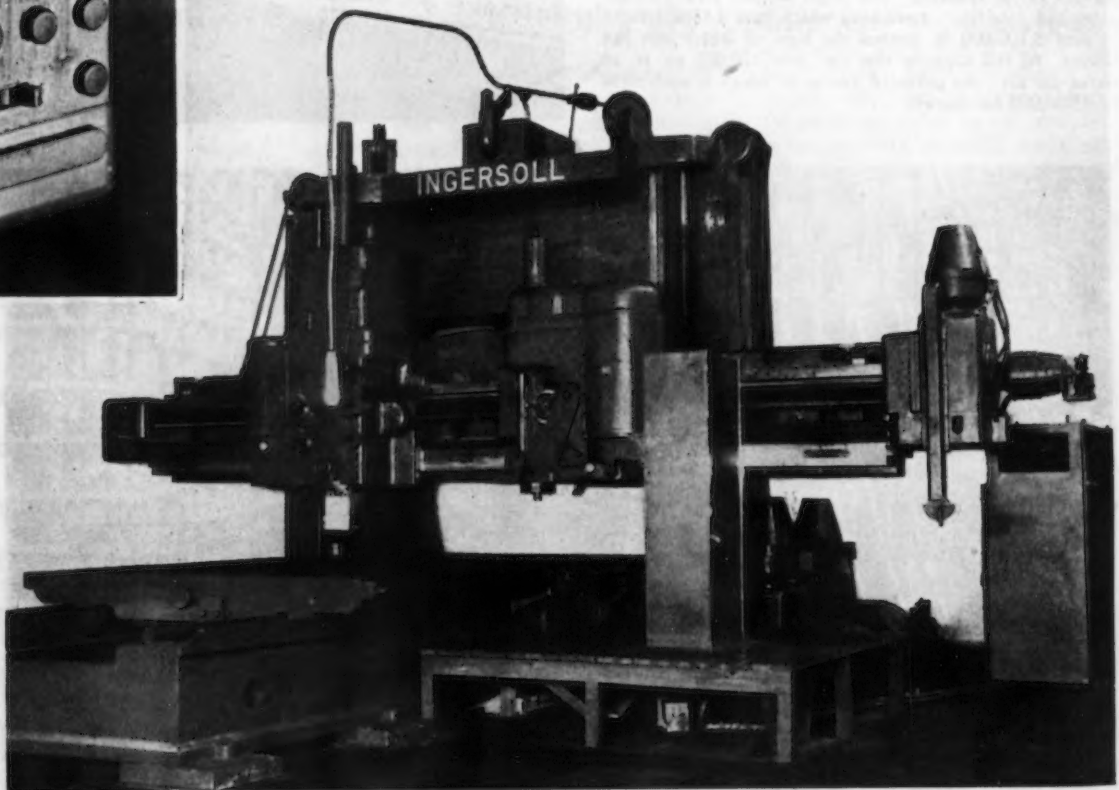


Machine for Roughing Large Die Blocks Features Electrical Control



ABOVE

This pendant remote control head provides push button control for the full operating range of the machine. The operator easily moves it to any convenient location.



AT RIGHT

This electrically controlled, adjustable-rail die sinking machine will take work 10 ft. wide, by 7 ft. high, by 14 ft. long.

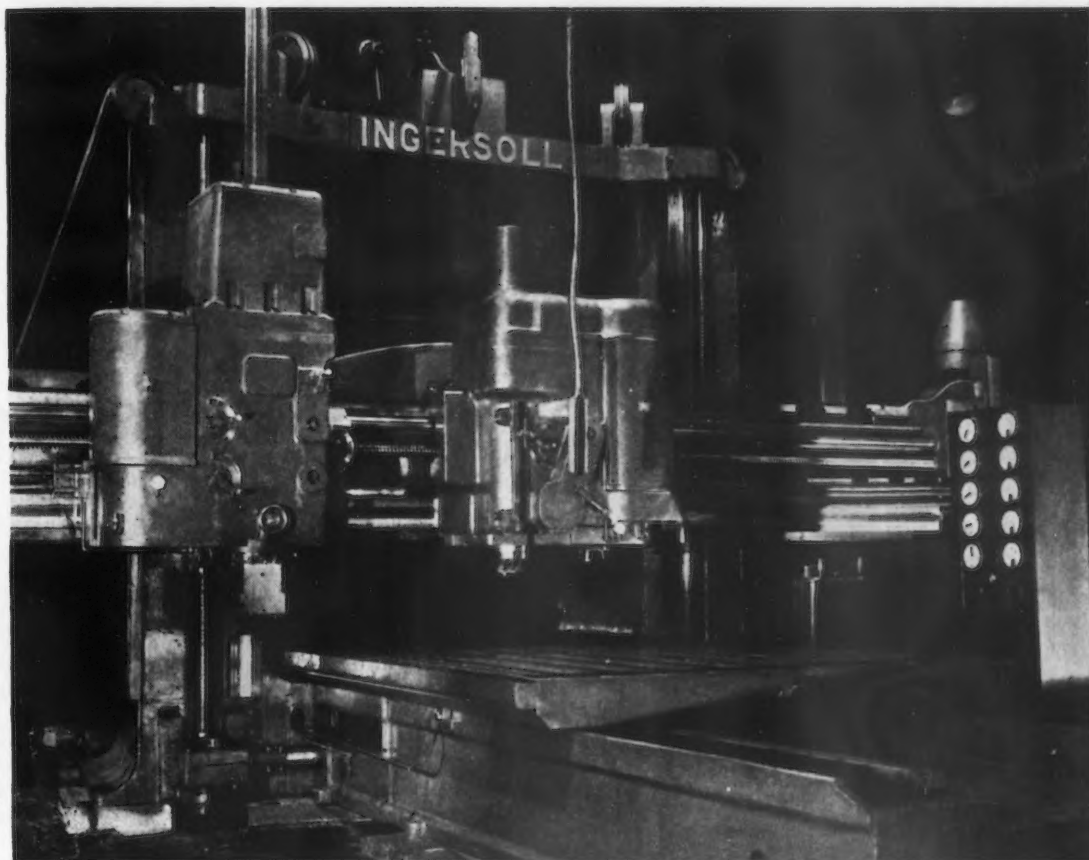
THE Fisher Body Division of General Motors Corp. has recently installed an electrically controlled, adjustable-rail die sinking machine which was designed and built by the Ingersoll Milling Machine Co., Rockford, Ill. This machine will take work 10 ft. wide by 7 ft. high by 14 ft. long. The character of its design is shown by the fact that its weight is 356,000 lb.

Among the more important features of this machine is the elimination of conventional hand levers usual to machines doing a similar class of work. This is accomplished by electric push button control either from a pendant push button box or from a stationary control panel. Remote

control of all motors, some of which are A.C. and some D.C., eliminates the need for clutches. All electrical cables are rubber covered, and, like the water hose, are placed to follow the lines of the machine. Both cables and hose are counterweighted so that there are never any unsightly slack lines. There are no sliding electrical contacts.

One Head Equipped with Ram Spindle

This machine is designed for roughing heavy stock and plain surfaces. As installed at the Fisher plant it is being used for roughing die blocks. Mounted on the rail are two heads. The left-hand head is



AT LEFT

All electrical cables and water hose follow the lines of the machine and are counterweighted so there are never any unsightly slack lines.



BELOW

A stationary control panel is also provided. Push buttons and switches are arranged and marked as on the pendant.

equipped with a standard spindle, and the other head with a ram spindle. The latter has a travel of 48 in. which is sufficient so that with the rail at the top of its travel the ram spindle can be lowered to reach the bottom of the die. A bevel gear drive is provided on the lower end of the ram spindle and this head can be turned through 360 deg. Both heads are driven through a single feed box, but each head has its manually-operated selector by which its motions are set. Three gear changes on the feeds combined with a motor speed ratio of four to one give table speeds from $\frac{1}{4}$ in. to 36 in. per min. and a head speed range from $\frac{1}{8}$ in. to 18 in.

A motor generator set provides current at 6 volts. It is mounted in a cabinet—the master control cabinet—which also contains all relays and circuit breakers. Adjacent to the die sinking machine is a control cabinet where are mounted indicators and a set of push buttons arranged in a manner similar to the push button arrangement on the pendant head which hangs over the bed of the machine.

Pendant Control Head Has Unusual Features

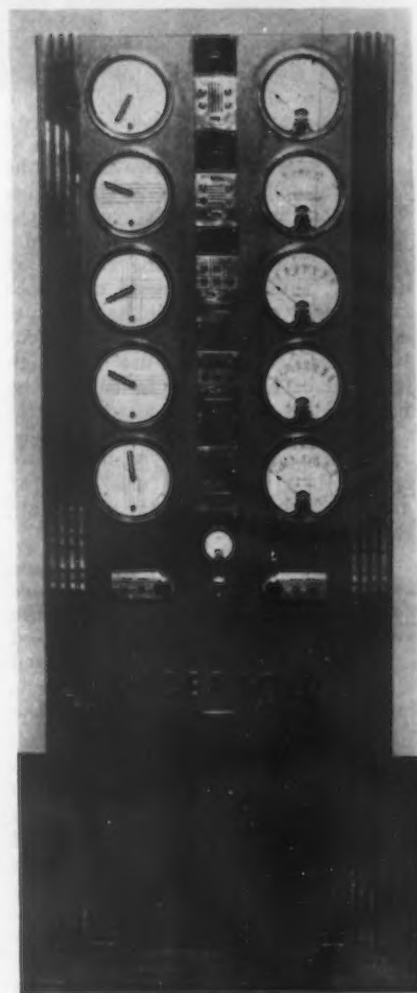
This pendant head is unusual in many respects. In the first place it provides push buttons for the full

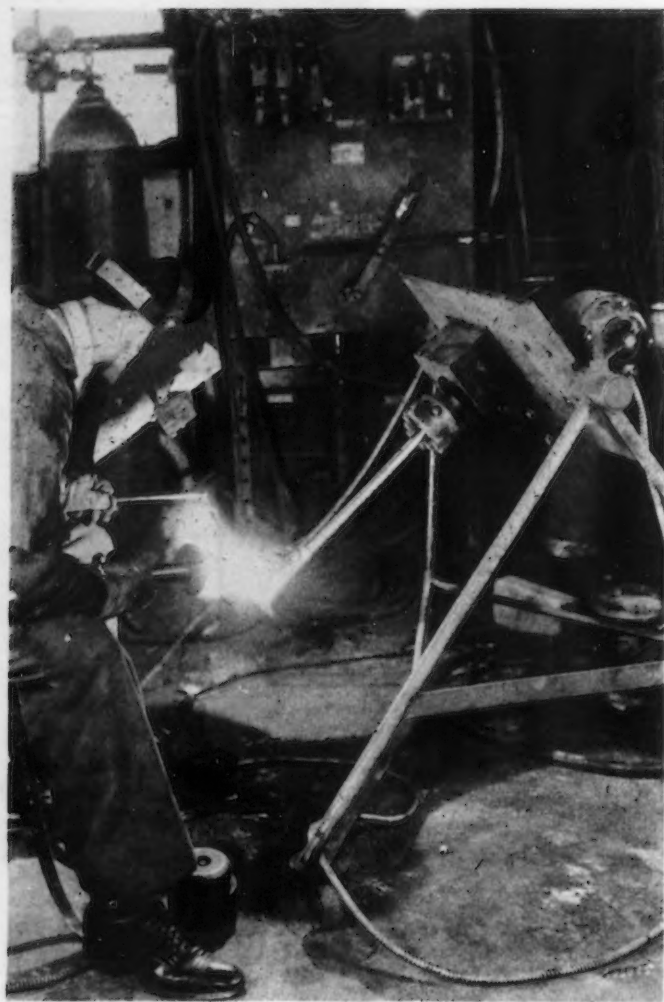
range of remote control of this machine. It is easily moved up and down as well as sideways so that the operator can move it to any work position which is most convenient to him. In moving this pendant head from one side of the machine to the other it does not follow an arc but travels in a straight line always parallel to the rail.

The upper two divisions, which control the two spindles, have a red background and the three lower sections are black. This was done as a means of quick identification by the operator. Each division or section has engraved on its face a series of lines, in some cases vertical, and in some cases horizontal, as well as a combination of vertical and horizontal lines. This was done so that the operator by feeling over the pendant head can soon learn to identify one section from another. These engraved markings are duplicated on the push button panels that are mounted on the stationary control cabinet.

The two top sections on the pendant control the ram and standard spindles. Each section has four push buttons marked faster, slower, run and stop. The "faster" and "slower" buttons control motor-operated rheostats. If a "faster" button is pushed

(Concluded on Page 78)





Valves and Valve Seat Insert Rings Surfaced by Atomic Hydrogen Process

▲ ▲ ▲
Layer of special alloy steel being fused into the seat on the head of a large gas engine valve by the atomic hydrogen welding process. The valve is held in the motor-operated revolving fixture as shown.

AN interesting application of the atomic hydrogen welding process is being employed by the Meriam Co., Cleveland, which is depositing one alloy on the surface of another, thus combining in one piece two grades of steel each having special properties which make it particularly adapted for the use to which it is put. The welding is used in the manufacture of large valves for stationary gas and Diesel engines. The valves are chrome molybdenum steel and to their heads are fused seats of another alloy high in heat and wear-resisting qualities.

By the same welding method chrome vanadium valve seat insert rings are surfaced with the same alloy as the valve heads. These rings are pressed into the cylinder casting and brazed in with an acetylene torch if the casting is of iron and arc welded if the cylinder block is of steel.

The valves are made in sizes up to a stem length of 2 in. with heads 8 in. in diameter and stems $1\frac{1}{2}$ in. in diameter and are used in engines of 100 to 400 hp. Chrome molybdenum is used for the valves because it retains its strength at high temperature or at the almost white heat that the valves attain while in service. The use of chrome molybdenum is said

to minimize or entirely eliminate the danger of a valve breaking off at the stem when hot, and the life of the valve is prolonged by the use of a more suitable alloy for the seats.

Deposit 1/16 to 1/8 In. Thick

The valve stem and head is a forging that is rough turned to size, and in forming the head provision is made for the addition of a 1/16-in. layer of the seating surface steel. This

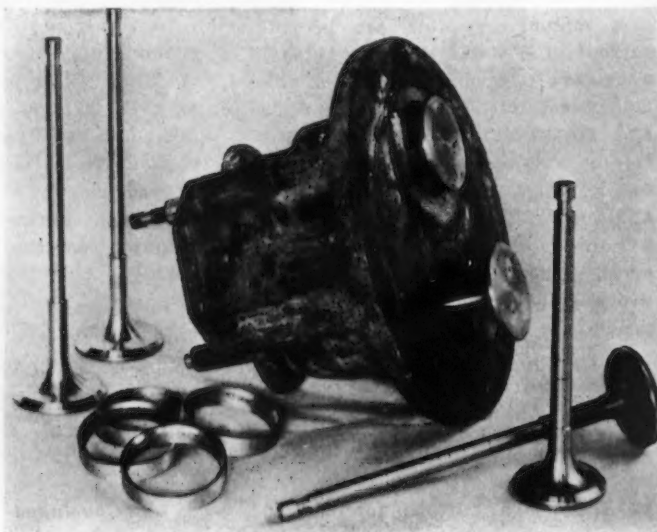
metal is deposited to a thickness of 1/16 to $\frac{1}{8}$ in. on the seat with an atomic hydrogen welding torch. The hydrogen flame envelops the work in a reducing atmosphere, preventing oxidation of the fused metals.

During the process of depositing the surfacing metal, the valve is mounted in a revolving disk with a friction-controlled drive from a variable-speed motor. It moves very slowly, making a revolution in about 45 min., as it takes that time to fuse the welded metal to the valve head to form the seat. In case the valve is turning faster than the welder can deposit the surfacing metal he stops its motion until he catches up with his work.

The valve seat is finish ground after the welding. The fusion of the two alloys is so thorough that there is no visible line to show the union of the two metals and the finished valve seat has a glossy smoothness and is claimed to be entirely free from blow holes and porosity.

A similar method of holding the forged chrome vanadium insert rings in a revolving fixture is followed while the surfacing alloy steel is being deposited on the seat of the ring.

▲ ▲ ▲
Some of the valves and the insert rings to which are also welded an alloy coating, and the position of the valves in the cylinder head are pictured at right.



National Founders Reappraise The New Deal

NEW DEAL policies were given close scrutiny at the thirty-eighth annual meeting of the National Founders Association, held at the Waldorf-Astoria Hotel, New York, Nov. 14 and 15. Virgil Jordan, president of the National Industrial Conference Board, recommended that the recovery act be continued as an emergency measure for two years and that the code authorities be used to administer wage subsidies to their respective industries. He declared that both the Government and industry had been diverted from the main purpose of recovery legislation, which was to get men back to work. To get all interests to reconcentrate their attention on that task it will be well for business men to talk less about lack of confidence, he said, and to devote more energy to the development of practical measures that will commend themselves to the Government.

F. H. Clausen, vice-president of the association and code director of the farm machinery industry, urged that any continuance of the recovery act be on a basis that would insure true self-government to industry.

Thomas W. Pangborn, president of the association, and J. A. Milholland, vice-president, Bank of Manhattan Co., New York, emphasized the danger of mounting Government expenditures and stressed the need of balancing the national budget.

Decries Attempt to Europeanize Our Industry

Whiting Williams, industrial investigator and writer, decried the theory of a worker class which had motivated the labor policy of the Administration. Class warfare had been encouraged on the basis of ideas imported from Europe, he declared, though co-operation and concord were more truly characteristic of employer-employee relations in this country. In an effort to provide security for the worker, the one aim of the permanent working class populations abroad, Washington has been closing the door to opportunity, long the dominant force in employment relations in a country with fluid rather than fixed classes.

"Most of the country's white-collared students of the labor problem," he stated, "make the mistake of as-



T. W. PANGBORN

suming that the American worker wants no more than does his European colleague. The fact is that our wage-earner here will never be content—and we ought never to wish him to be content—with that mere minimum of security and that abandonment of promotion up the line which is represented by the New Deal's philosophy of level-down and dig-in subsistence. That philosophy now threatens to Europeanize our industry—to turn the Land of Getting On into the Land of Holding On."

The Bugaboo of Imaginary Laws

David R. Clarke, attorney, Chicago, declared that industry had been the victim of a bugaboo of imaginary laws built up by administrative officials in handling employee-employer relations and that it was time to determine what the actual statutes were. He pointed out that only Congress can make laws and that only courts can determine the proper construction to be placed on laws, as well as their validity or invalidity. Executives, he asserted, cannot determine the validity of laws, cannot enforce invalid laws, cannot construe laws and cannot make laws. The national and regional labor boards, he said, have no powers beyond fact-finding and investigation. They have no authority to determine the guilt or innocence of persons accused of violating the law.

Section 7-a of the recovery act

"does not place any halo around the head of any union or any union man," he emphasized. "It leaves a union man just like any other man, and it leaves a union just like any other employee organization. You can refuse to hire and you can fire a union man for any reason you can refuse to hire or fire any other man. You can warn your employees against bad union leaders just as you can warn them against any other bad leaders. You don't have to enter into any employment contract that you don't want to enter into. You don't have to treat anybody as the representative of anyone who has not chosen him as his representative. You don't have to turn anything over to anyone for arbitration. You are not bound to do or to refrain from doing anything because any labor union, or any labor board, or any other representative body or official tells you to. You are only bound to do and to refrain from doing what the law tells you to do and to refrain from doing—and that is assuming the law to be valid."

There was an attendance of 192. Officers were reelected for the coming year. The personnel of new district committees is shown in an adjoining column.

Jordan Sees Politics Blocking Recovery

DOCTOR JORDAN, in his address, stated that the country is still as far from recovery as it was before the recovery act was passed. Despite gyrations, the business curve in November, 1934, is at about the same level as in November, 1933, and November, 1932.

He declared that there was no evidence that the present depression was different in its main essentials from the 17 preceding depressions that had occurred in this country since 1800. Those essential processes of recovery that had brought us out of previous depressions made their appearance in the middle of 1932, and by November of that year considerable progress had been made toward recovery. From then on the whole course of recovery was dominated by purely political factors such as no other country has had to contend with. The struggle for political power to impose profound changes in our economic system has

distorted, disturbed and almost completely offset the normal course of recovery, with the consequence that there has been virtually no net gain, he stated.

From March, 1933, to July, 1933, we were making very rapid progress toward recovery, but then the enactment of legislation embodying the theories of the new Administration, precipitated a reverse movement. Finally, in November, 1933, we had another upward movement, stimulated by public expenditures, and this carried into May, 1934, but did not duplicate in magnitude the upturn that terminated in July of the year before. From May until November of this year there was another severe recession and now there appears to be a resumption of the upward movement, but at a slower rate. The general trend since July, 1933, has been downward, with oscillations above and below the line, and there is little likelihood of a turn permanently upward until the pressure of political forces is removed, he stated.

We had practically liquidated the depression in November, 1932, Doctor Jordan stated. But unfortunately both the Administration and business men had lost faith in the old recipes for recovery and were willing to try any and all experiments except the old, simple remedy of freedom. But the time has come when the Administration can no longer rest its case on a denunciation of the old remedy. It must now stand or fall on the real effectiveness of its own program of putting men back to work and increasing the man-hours of employment.

American People Divided into Two Groups

That task has been complicated by the fact that the American people are now mobilized into two great groups:

1. The unemployed, the unemployable and those unwilling to work, who probably embrace a sixth of our population and are politically organized to exploit the rest of the population.
2. The great group embracing the thrifty, the industrious and the enterprising.

The first group is becoming progressively more conscious of its community of interest and its political power to penalize thrift, enterprise and investment and progressively to expropriate and exploit the rest of the population.

The Administration Must Choose

While a large part of present unemployment is artificial, in the sense that it is due to Government policies, it is daily becoming more permanent as more and more people fall into the unemployable group. This fact makes it clearer that every aspect of the problem of recovery reduces itself to the single task of increasing employment. If the Administration had con-



J. M. TAYLOR

centrated on that one task it would have gotten to the heart of the depression, Doctor Jordan stated. And it must make a decision soon, perhaps within the next six months, as to whether employment shall be increased through a revival of private enterprise or through nationalization and Governmental control. A combination of the two is impossible. We must either progressively abandon the effort to reemploy through Governmental effort or go on and destroy the capacity of private business to employ.

The country has complacently accepted various moves toward nationalization as emergency measures. But it is a delusion to believe that the process of extending Governmental activity can be easily stopped. Only three stages in nationalization are necessary to make complete socialization of our country inevitable. These are the nationalization of credit, the nationalization of power resources and the nationalization of transportation. The foundations for the nationalization of credit have been effectively laid through the relations of the Government to the Federal Reserve system and of the Reconstruction Finance Corporation to the banks. Nationalization of power is already in progress. Nationalization of transportation is far advanced, having been under increasing Governmental control for a considerable number of years.

What of the alternative of stopping the trend toward greater Governmental intervention in business and bringing about reemployment by private enterprise? Reemployment by private enterprise means reduction of costs—both labor and governmental—to make operations profitable. It is as simple as all that, declared Doctor Jordan. But the balance of political forces and the power of mass emotion or delusion make it almost impossible for the Administration to restore a condition where such cost reductions can be made. It is politically impracticable to say that we must have lower

wages or that we must reduce Government expenditures to lower the tax burden. It will be all the Administration can do to resist pressure for increased spending and to stop further nationalization.

What can be done? One good step, in Doctor Jordan's opinion, would be to get the handling of relief funds back into the States and to substitute loans to the States for outright grants of Federal funds. This would increase local responsibility and tend to reduce waste and extravagance.

Suggests Wage Subsidies to Industry

Another method of stimulating private employment, in Doctor Jordan's opinion, would be for the Government to grant wage subsidies to private industries. As between uncontrolled political distribution of relief funds and the use of those funds for private enterprise it is better to take a chance on the latter, he said. If the Government paid, say, 25 per cent of the payroll to finance additional employment, unit labor cost would be reduced and the chances for profit would be enhanced.

The code system offers an effective method of administering such a subsidy.

Proposes Tax Reductions for Capital Outlays

Another means of stimulating private enterprise suggested by Doctor Jordan was amendment of the income tax law to permit a percentage reduction from the gross income of corporations or individuals for outlays for building construction, machinery purchases and other investments in durable goods. Such a measure, he said, would bring about a marked expansion in business all along the line so that income tax revenues would increase rather than decrease.

Doctor Jordan counseled business to avoid attempts to amend the recovery, securities and stock exchange acts at this time. The reinjection into politics might well result in more burdensome legislation, and, besides, the worst features of the acts can be effectively mitigated by the manner in which they are administered. With reference to the recovery act, he recommended that it be extended as an emergency measure for two years.

Urges Greater Degree of Self-Government

MR. CLAUSEN urged new legislation altering the recovery act so as to guarantee self-government by industry. It should provide, he said, that each industrial group formulate and put into effect its own rules of fair competition subject only to Governmental approval.

"The initiative and the responsibility should be upon industry itself. Not only the original initiative but all developments and changes up to the

point of Governmental approval should belong solely to industry. Those actively and responsibly engaged in an industry have that understanding of problems which is necessary if rules of industrial conduct are to promote sound conditions in the industry.

"The Governmental agency should have only the power of approval or of veto. This does not mean that the Governmental agency, if inclined to disapprove the proposals of an industry, should not in proper cases be able to express the condition upon which it would grant approval. But in any such case, the acceptance of the conditions, and the formulation of provisions to meet them, should be wholly voluntary upon the part of industry. It would be wholly inconsistent with the theory and the spirit of such legislation as is under discussion for any industry to be subjected to any form of compulsion or coercion.

"Rules of fair competition, when formulated, should be suitable for the whole industry with due consideration to small units. . . .

"Rules of fair competition should deal with basic principles and should be simple in form. Simplicity and enforcement go hand in hand. Provisions fixing minimum prices and quotas should be approved only where the public interest and conservation of resources can be promoted thereby.

Opposes Inflexible Hourly Provisions

"Provisions in a voluntary code for an industry prescribing minimum wage rates, maximum hours and prevention of employment of child labor may be properly related to terms of fair competition . . . It is generally regarded as a fact that code provisions for minimum wages have been observed and that actual hour earnings have been well above requirements . . . I do not believe in inflexible hourly provisions applying to any or all codes. The greatest number of man-hours of employment is directly related to cost of goods offered for sale which, translated into movement of commodities, means volume of business done. There is therefore a definite limit to the reduction of weekly hours and this limit must vary in different industries. With the return to normal employment conditions the need for flexibility will become more and more apparent.

"Provisions in new legislation relating to working conditions should recognize that the relationship of worker and employer is one of mutual advantage and not of inherent antagonism. . . .

Right of Termination Should Be Guaranteed

"Any new legislation should give an express right of termination corresponding to the right of initiation and presentation of rules of fair compe-



A. E. McCLINTOCK

tition and of agreements which have been approved, upon giving reasonable notice to the Governmental agency, and there should be a similar right in the Governmental agency to terminate upon reasonable notice and after hearing. Such a right of termination by those responsible for the rules or agreement is necessary by reason of the theory upon which the legislation will be based. There may at any time be good reason for such termination because those engaged in the industry find that the rules to promote the purpose in view operate inequitably, or because conditions in the industry, by reason of factors entirely apart from the rules, have changed."

Sounds Alarm Against Swelling Debt Burden

PRESIDENT PANGBORN, in sounding the alarm against our growing Government indebtedness, said:

"The United States is running into debt. It has been operating with a deficit for four successive fiscal years; it has run up new debts of more than 11 billion dollars. Added to debts already contracted, the Government owed some 27 billion dollars at the close of the fiscal year.

"In other words, in four years it has borrowed through the banks 11 billion dollars, giving the people for their savings its I.O.U. in the form of bonds, notes, certificates and bills, and has now mortgaged its future more heavily than ever before. In addition to these direct Treasury obligations, there are now in the hands of the public more than a billion dollars' worth of Home Owners' Loan Corporation bonds and Farm Credit Administration bonds which the Government has guaranteed 100 per cent. Government officials tell us that of the seven billions spent last year, some two billions were lent, and that these loans will be repaid. Perhaps so, but past experience would lead one to suspect that in part at least these

debts will still confront us for many years to come.

"Can business pick up enough to provide further increases in revenue? And the larger question: Can the Government stop these expenditures in a democracy where the voters will insist not only upon no stop but upon more and more spending? Can normal business activity resume with this levy upon the savings of the people (that is, capital), which savings hitherto have gone into creative enterprise, creating continuous employment? Or will there be a repudiation of Government obligations through the devious methods of inflation?

"Some day the budget will have to be balanced and the long string of deficits and debts stopped. Any other course would end in bankruptcy for the Government. . . .

Condemns Government Competition With Business

"I have noticed for some years that Government competition in business has been a subject of wide discussion. Organizations of business men have a natural and proper concern in activities by the Government which vitally affect their interests. Competition among business men, as individuals or combined in partnerships or corporations, is accepted as a normal condition, unless it is carried on by 'unfair' methods. An equal opportunity exists under conditions of fair competition. All influences that impair equality are instinctively felt to be unfair.

"An essential objection of business men to competition from the Government lies in the circumstance that the Government's operations are essentially unfair, and the unfairness is aggravated because it proceeds from the Government for whose activities they are taxed. The Government's operations can be carried on without regard to the elements of profit or loss, which are unavoidable in private business because deficits must be made up by the same people with whom it competes. The Government can furnish the funds which are employed, largely from taxation, without requiring payment of interest, let alone dividends, out of the business. Public property used by the Government in business is free from any burden of Federal taxation and is removed from taxation by the State, county and town in which it is situated. Without charge to the business, supervision may be furnished by officials serving the Government in other connections, or by officers of the Army or the Navy.

"It is obvious, therefore, that in any field of business which the Government chooses to enter, private business will be proportionately eliminated. Unless our people are prepared in a given field, be it broad or narrow, to have the Government do all the business, the Government

should not enter that field at all, except in case of national emergency, and, then for the duration only of the emergency.

The Menace of Power Developments

"With these premises as a background, I venture to invite your attention to such Governmental activities as the Tennessee Valley Authority, the numerous Federal hydroelectric power developments now under way, the operation of factories for the unemployed and the Government house building projects.

"The Tennessee Valley experiment was inaugurated for the purpose of providing a 'more abundant life' for the 2,000,000 inhabitants of that territory, and with the desirability of this purpose no one can disagree. Whether or not the experiment will provide the improvement expected, I do not know. I am merely looking at it to interpret its effect on business and business men.

"First of all it was undertaken as an experiment. No one knows what it will cost, and no one knows how long it will be in the making. It is not a part of the emergency relief program. It is, according to one high Government official, 'a deliberate turning toward the future, the commitment to an ideal. Its success may depopulate cities.' According to Doctor Morgan, 'it is well that policies be tested in a limited area rather than that the inevitable trial and error method be first applied on a nationwide scale. The nation can well afford the investment, for it can thereby

learn how to plan in other regions.' That statement is worthy of study.

"The TVA can only do what it has engaged to do through the constant aid and support of the Federal Government. Its territory covers more than 40,000 square miles, crosses the lines of seven States, and includes 2400 incorporated towns and villages. Such cities as Chattanooga and Knoxville, Birmingham, Memphis, Atlanta and Louisville are within the transmission radius of its electrical output.

"One of the reasons for its creation was to serve as a 'yardstick' to measure the cost of producing electrical energy by privately owned utilities. In fact, the development includes the generation and sale of power, the development of fertilizers, and a program of social and economic planning with the aim of promoting the social and economic welfare of the region and of the nation. To accomplish this the TVA was created, a 'corporation clothed with the power of Government but possessed of the flexibility and initiative of a private enterprise.' What better evidence of the fact that here is a test tube of complete socialization of commerce and industry and control of the lives of the inhabitants.

"If we are to believe the public prints today, the TVA experiment, even at this early stage, is deemed sufficiently feasible to extend the plan, for I recently noted that the Natural Resources Board is preparing to make the following recommendations:

"That a series of commissions be set up similar to the TVA to plan and super-

vise the development of various watersheds of the country;

"That there be one central authority in Washington to coordinate the work of the various groups;

"That annual appropriations be made for an undetermined number of years to enable steady development. One unofficial estimate is that 400 to 500 million dollars a year would be needed.

"To us such developments may seem too remote to affect business or disturb confidence. But I note the coal industry through the National Coal Association has already taken steps to meet 'the menace to the coal industry of the TVA and similar projects'; that the holders of public utility securities are worrying as to how their investments will fare in competition with a government project with a trunk line into the Treasury, and that with the interrelation between public utilities and insurance policies and savings accounts people are becoming a bit more curious as to just where our capitalistic system, based on private enterprise, is headed. If the Government applies tax revenues to the construction and operation of power plants, to the operation of commissaries, to the financing of the purchase of equipment in one section of the country, it requires but little imagination to envision such operations on a national scale. If the Government subsidizes one section of the country toward a 'more abundant life' it is only human nature for all sections to insist on it.

"There are other enormous Governmental power projects under way,
(Continued on Page 70)

Officers and District Committees for 1934-1935

President, Thomas W. Pangborn, Pangborn Corp., Hagerstown, Md.

Vice-president, F. H. Clausen, Van Brunt Mfg. Co., Horicon, Wis.

Commissioner, A. E. McClintock, 29 South LaSalle Street, Chicago.

Secretary and treasurer, J. M. Taylor, 29 South LaSalle Street, Chicago.

DISTRICT COMMITTEES

FIRST

Franklin R. Hoadley, Farrel-Birmingham Co., Inc., Ansonia, Conn.

E. H. Ballard, General Electric Co., West Lynn, Mass.

A. W. Calder, Jr., New England Butt Co., Providence, R. I.

A. B. Root, Jr., Hunt-Spiller Mfg. Corp., Boston.

Thorwald F. Hammer, Malleable Iron Fittings Co., Branford, Conn.

SECOND

J. L. Lonergan, Morris Machine Works, Baldwinsville, N. Y.

Roger Williams, Richardson & Boynton Co., New York.

V. C. Kreuter, American Laundry Machinery Co., Rochester, N. Y.

W. W. Bates, Delaware & Hudson Railroad Corp., Albany, N. Y.

W. H. Cole, Moore Brothers Co., Elizabeth, N. J.

THIRD

William L. Little, Bucyrus-Erie Co., Erie, Pa.

George T. Ladd, United Engineering & Foundry Co., Pittsburgh.

H. W. Johnson, DeLaval Steam Turbine Co., Trenton, N. J.

W. S. Shipley, York Ice Machinery Corp., York, Pa.

D. C. Bakewell, Duquesne Steel Foundry Co., Pittsburgh.

FOURTH

Ralph H. West, West Steel Casting Co., Cleveland.

William B. Cullen, Miami Foundry Co., Miamisburg, Ohio.

George A. Seyler, Lunkenheimer Co., Cincinnati.

Fred Erb, Eaton-Erb Foundry Co., Detroit.

Ferris Taylor, Dean Brothers Co., Indianapolis.

FIFTH

John B. Strauch, National Bearing Metals Corp., St. Louis.

A. H. Head, John Deere Tractor Co., Waterloo, Iowa.

Alfred Kauffmann, Link-Belt Co., Chicago.

H. G. Myers, Gardner-Denver Co., Quincy, Ill.

H. E. Muchnic, Locomotive Finished Material Co., Atchison, Kans.

SIXTH

Curry S. Prescott, Prescott Co., Menominee, Mich.

John N. Brawley, South Park Foundry & Machine Co., South St. Paul, Minn.

Walter Harnischfeger, Harnischfeger Corp., Milwaukee, Wis.

R. A. Peterson, Valley Iron Works Co., Appleton, Wis.

L. S. Peregoy, Sivy Steel Casting Co., Milwaukee, Wis.

SEVENTH

W. C. Trout, Lufkin Foundry & Machine Co., Lufkin, Tex.

H. A. McLellan, General Fire Extinguisher Co., Atlanta, Ga.

R. C. Stobert, Hardie-Tynes Mfg. Co., Birmingham, Ala.

H. E. McWane, Lynchburg Foundry Co., Lynchburg, Va.

Mr. Brainard, Beaumont Iron Works Co., Beaumont, Tex.

HONORARY MEMBER

S. Wells Utley, Detroit Steel Casting Co., Detroit.

Electric-Control of Torque Braking Is Embodied in a Motor Assembly

A NEW disk-type, electrically operated torque brake, applicable to several types of G.E. motors and especially suited for controlling small hoists, cranes, winches and similar purpose equipment, which require no more than 50 lb.-ft. braking torque on a continuous basis or 75 lb.-ft. on an intermittent basis, is presented by the General Electric Co., Schenectady, N. Y., and is shown on page 40. A considerable range of motor mountings and wirings is available or the brake may be installed as a separate floor unit for operation with equipment in use. In construction the new device is comparable to a multiple disk automobile clutch. Braking pressure is applied, whenever the motor power-supply is interrupted, by an easily adjustable, calibrated helical spring which forces the non-rotating disks against rotating ones which are splined to the motor shaft. The braking torque is removed when voltage is reapplied to the motor; a magnetic system compressing the spring and releasing the pressure against the disks.

The design of the magnetic system provides for only a small air gap. This limits the inrush-current and, therefore, the power consumed by the brake, and permits the disks to travel

only a correspondingly short axial distance. This results in quick, smooth action which minimizes stresses to the benefit of not only the brake but of belts, chains, cables or gears to which the motor may be connected, and permits the use of a greater area of braking surface.

Two adjustments, both of which may be easily made without removing the cover, are provided. One, by turning a stud in the center of the end plate, varies the torque. A predetermined value is obtainable by setting this stud so that the distance from the end plate to the spring seat corresponds to that indicated on a characteristic curve supplied with every brake of the disk type, the distance being easily measured by inserting a scale into a hole provided for the purpose. The other adjustment, which compensates for lining wear, is made by using a brass gage to determine the correct distance that should be maintained between the end plate and the magnet-armature plate. This distance may be conveniently varied by means of three "elastic-stop" nuts which hold the end plate securely in place. In the issue of Oct. 11, *THE IRON AGE* described a heavy-type thruster control and pictured an installation at Boulder Dam.

Light Weight High Speed Hand Grinder

THE new No. 9 Dumore hand grinder, built by the Dumore Co., Racine, Wis., has an easily removable air filter, positioned in the inclosed end-cap. The ventilating fan is of the vacuum cleaner type. The grinder is designed particularly for work requiring considerable power; the motor develops 1/5 hp. Equipped with three ball bearings the tool operates at 14,250 r.p.m. Spade type handle mounting is illustrated on page 41.

Automatic Heat Treating Unit for Small Parts

A SMALL rotary-hearth type electric furnace designed, for the heat treatment of miscellaneous light weight parts, is announced by the Electric Furnace Co., Salem, Ohio. The parts to be treated are dropped on to tilting trays by a sliding bottom loading pan, carried around the furnace on an alloy hearth, and are heated to a desired temperature, after which they are dumped through a chute to a water or oil quench, from

which they are removed by a conveyor. The furnace is said to be especially adapted for heat-treating springs, bolts and sundry machine screw products. The illustration on page 40 shows the charging door of the furnace, quench tank, conveyor, recording controllers, and other equipment including the transformers located above the control panel.

Manufacturer Improves Sand Blast Equipment

TWO new types of sand blast cabinets and recently incorporated new features added to the older types are announced by the Ruemelin Mfg. Co., 1574 South First Street, Milwaukee. New features are: all steel welded construction; one piece operator's vision screen with glare shield to exclude daylight from the line of vision, and automatic abrasive mixer with adjustment for any type of abrasive including steel grit, steel shot, silica sand or fine powder. All cabinets can be adapted to belt conveyors, gravity chutes or roller conveyors for production work. See page 41.

Type AT, a new development, can be fitted with an 18-in. revolving table

attachment. The table is rotated by hand while blasting. Type AG, also new, has a dust-tight front door which is fitted with rubber gloves and leather gauntlets. The gun is mounted vertically, either rigidly or swung from the hinged support arm. The air valve is foot treadle operated. This cabinet is recommended by the manufacturer for cleaning flat pieces, or small, delicate parts. The exhaust fan is mounted on the roof of the cabinet.

Hoist Features One-Button Five-Speed Control

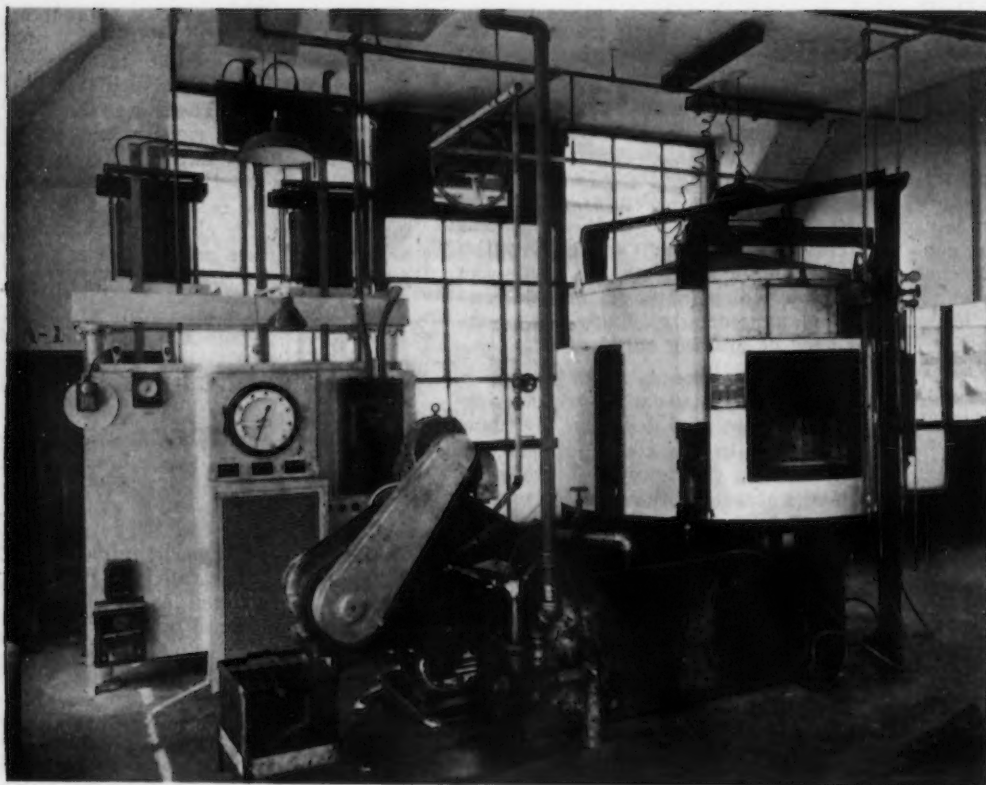
FIVE speeds from one-button, selective control for cranes and hoists is announced by the Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y., and is illustrated on page 41. Deceleration as well as acceleration, it is said, is obtained by thumb-button pressure; the operator "feels" each of the five independent speeds when the button is pressed or released. From the first or creeping speed, each of the succeeding four speeds gives a gradual increase of torque. By button-release through the same gradual action, the motor is brought to stop. It is said to be entirely practical to jog the button between two contacts, and that such procedure involves no heavy arcing or mechanical strains. Where motions other than lifting or lowering are to be controlled, independent buttons are provided for the movements. The new controllers are rated at 3 hp. and 7½ hp., respectively.

Anti-Bootleg Grease Containers

GREASES, packed in non-refillable cartridges which fit a new type of grease gun, are now being marketed by the Standard Oil Co. of Indiana.

The cartridgeing procedure is said to be new and to assure correct greasing. To fill the new type of grease gun the operator merely slips a factory-loaded cartridge into the barrel of the gun which is then ready for use.

The cartridges are of one-pound capacity and include several grades of lubricant, either fluid gear lubricant or fairly stiff grease. A partially used cartridge can be quickly replaced with another cartridge containing a different grade of lubricant; the lubricant in the used cartridge is not wasted and does not accumulate dirt as the cartridge is inclosed. Each cartridge has a sliding bottom which acts as a plunger to feed the lubricant into the high pressure chamber in the nose of the gun.



AT LEFT

Small parts, produced in quantities and requiring heat treatment, sometimes present a treatment problem. A complete automatic unit for such work is described on page 39.

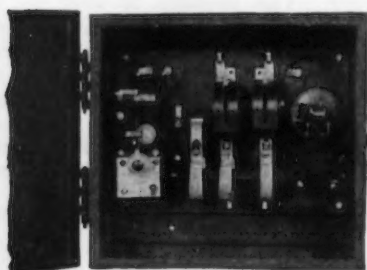
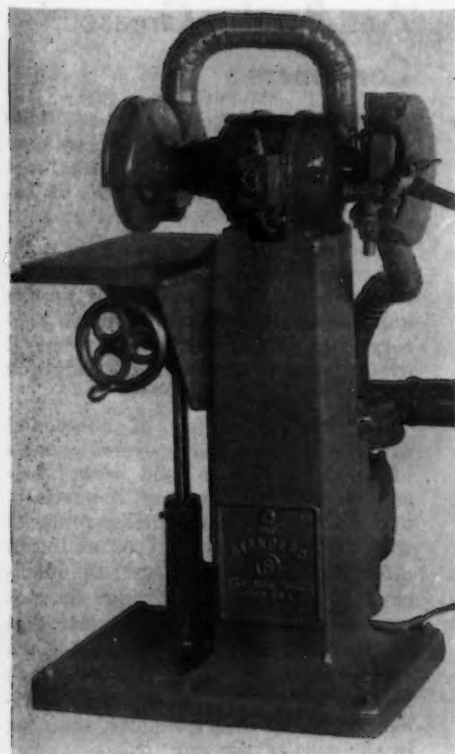
BELOW

This overhead individual heating unit is designed to permit changing the direction in which the hot-air stream is shot. Some of the details are given on page 42.



AT LEFT

BOTH electrically operated brakes, as described on page 39, and thrust or operated brakes, as described in the Iron Age of Oct. 11, indicate the attention which is being given to equipment control.

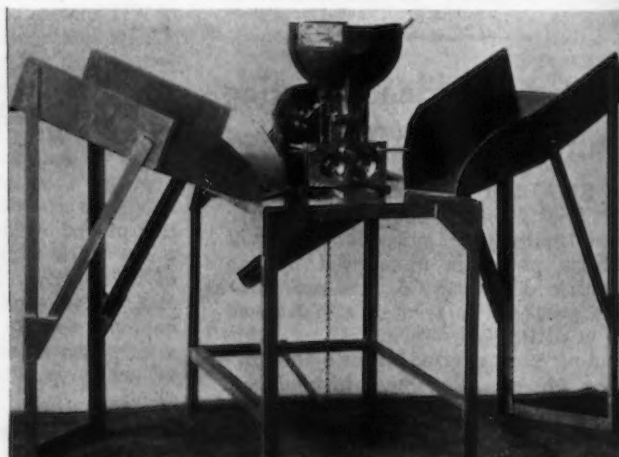


ABOVE

A NEW weld timer, said to be unaffected by line voltage variations or surges, is described on page 42. It is a product of the General Electric Co.

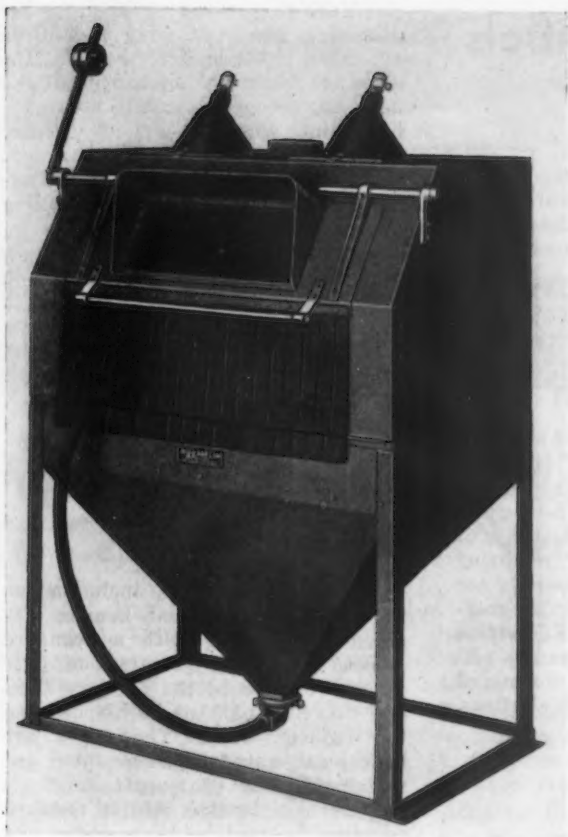
AT LEFT

THE Standard Electrical Tool Co., Cincinnati, has announced a new 10-in., surface and tool grinder the specifications of which are given on page 42.



BELOW

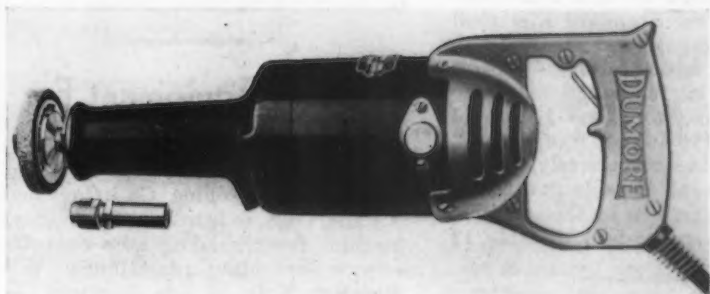
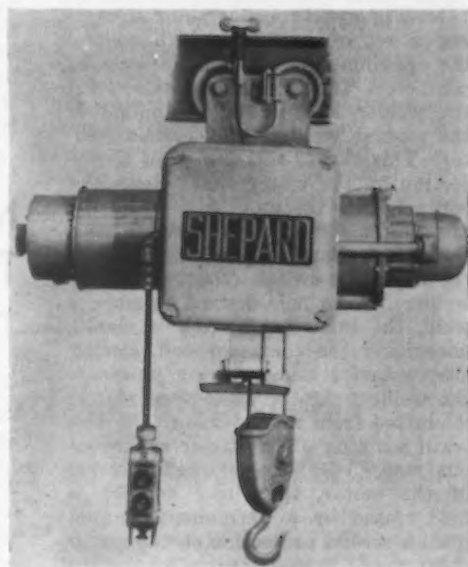
A UNIT equipment for the rapid assembly of bolts and nuts is described on page 42. Two chutes feeding from a common hopper facilitate the work. The equipment is portable.



AT LEFT
A MANUFACTURER of sand blast equipment has not only brought out new models, but has bettered the operating features of previous standard models. See page 39.

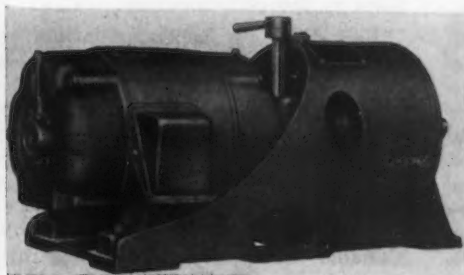


AT RIGHT
A NEW development in the selective control of cranes and hoists made by the Shepard Niles Crane & Hoist Co. features a one button control of five speeds and is outlined on page 39.



ABOVE

THE new Dumore hand grinder, described on page 39, incorporates an easily removable air filter. The fact that the tool weighs only 7 lb., although the motor develops 1/5 hp., is stressed. The tool is said to operate at a speed of 14,250 r.p.m.



ABOVE

SPEED reducer units of this type are produced by the Century Electric Co. The type of housing used for the assembly of the unit is optional. A resilient coupling is used as described on page 42.

AT RIGHT
THESE all-steel, press-type bending brakes are described by the makers as being particularly rugged. Some of the construction details are referred to on page 42.



Motor-Operated Weld Timer Controls Resistance-Welding Power Supply

A NEW synchronous motor-operated timer, Type CR7993, for automatically timing the power supply to resistance welders by controlling the contactor on the welder, is made available by the General Electric Co., Schenectady. It is said that the timing selected is unaffected by line-voltage variations or surges and that when adjusted for welding two thicknesses of metal the control will provide satisfactory welds when several thicknesses of metal are placed between the electrodes—no change in timer or welder setting being required. Illustration on page 40.

This timer consists of a 1-rps. reversing synchronous motor operating a set of contacts which control the opening and closing of a welding contactor. In normal operation, with the welder idle, power is applied to the reverse winding of the timer motor. This causes rotation until a projection on the motor shaft closes the contact, hits the stop, and stalls the motor. This contact is in series with the line contactor operating coil and the initiating switch (control) on the welder. When it is desired to make a weld, the initiating switch is closed, energizing the contactor coil, closing the contactor and applying power to the welder. At the same time, power is shifted from the reverse to the forward winding of the timer synchronous motor. During forward rotation of the motor, the timer contact is held closed by a permanent magnet until a second projection on the motor shaft opens it and thereby opens the line contactor circuit and removes power from the welder. Thus the duration of current flow at the weld depends only on the setting of the timer and has no relation to the length of time the initiating switch is closed. Opening the latter switch allows the timer to reset automatically for the next weld. Resetting does not take place, however, until the completion of a weld, even if the initiating switch is closed but momentarily, because an interlock on the welder contactor holds the circuit for the duration of the weld.

Setting the timer to provide a given duration of welding current is accomplished by means of a graduated disk associated with the second projection on the timer motor shaft. A range of from 1/12 to 5/6 of a second in one-cycle steps (60-cycle supply) is thus available—a range suitable for all usual welding requirements. Longer welding times, up to five seconds, can be obtained by the use of a lower-speed timer motor.

The new timer is furnished in several different forms. In addition to the timer unit alone, combinations of

the timer with single- and double-pole large and small contactors are available, each form being inclosed in a suitable case with hinged cover.

Overhead Heat Unit Directs Air Stream

INDIVIDUALLY controlled overhead heat units are built in 16 steam and 14 hotwater sizes by the Modine Mfg. Co., Racine, Wis. A hook-up is pictured on page 40. The device is of suspended, propeller type, requiring no supporting brackets, pipe-rods nor straps and features 360 deg. of rotatability which permits of adjustable line direction for the heated airstream in addition to the downward adjustment provided through shutters.

New Surface and Tool Grinder

THE new surface and tool grinder shown on page 40, is a recent development by the Standard Electrical Tool Co., Cincinnati, and is covered by the following specifications: Weight 549 lb., base 20 in. by 28 in., table 11 in. by 21 in., two sizes—1 hp. and 2 hp., wheels 10 in. by 1 in. and 12 in. by 1½ in. respectively, hand-wheel adjustment of table five turns, 1 in., dial graduations by thousandths, maximum distance wheel to table 12 in.

New Vertical Bending Brake for Jobbing Work

NEW design in vertical press-type bending brakes is presented by the Steelweld Machinery Co., Cleveland, and is pictured on page 41. The construction is steel welded box-type housing with an 18-inch throat. The crown is of open-box construction and serves both to reduce height and as a tying member. The flywheel is mounted between the housings on roller bearings and is drilled in a manner to provide air-cooling for the clutch. The clutch and brake are of disk-type and are mounted on opposite sides of the housing. The clutch pedal is removable, without use of tools, to eliminate danger in die setting. The ram can be swiveled, making it possible on a 10-ft. machine to do taper work up to ¼ in. per ft. The ram swivels on the guide, only one guide is gibbed laterally to the housing, the opposite guide is given

clearance to prevent opportunity for cramping. The positioning mechanism is located in the back of the ram. The eccentric shafts are solid forgings and have the eccentric directly above the ball joint, which is a steel cylinder welded into the ram. The hardened and ground worms run on ball bearings; the worm gears and adjusting nuts are bronze; the assembly is inclosed. The design is said to provide that no simple or compound stress in any member shall exceed 7500 lb. to the sq. in. and that no bearing pressure shall exceed 2500 lb. All sizes are twin-gear driven and have micrometer dial gages to indicate settings.

Eight-Speed Motor Reducer Unit

ATWO-SPEED unit, including an adjustable base and housing, for assembly-mounting with a standard 4-speed motor, as pictured on page 41, is presented by the Century Electric Co., St. Louis, as an 8-speed motor reducer unit. The gears are helical cut, anti-friction mounted and run in oil; the gear shift handle is conveniently located and a resilient coupling is used between motor and gear unit. The housing can be open, semi-inclosed, or fully inclosed. The motor may be wound for either single or two or three phase power.

Portable Equipment For Bolt and Nut Assembly

THE Kent Machine Co., Cuyahoga Falls, Ohio, is introducing a nutting machine for threading nuts on bolts, screws or other fastenings with diameter ¾ in. or less.

The nuts are fed down two chutes from one common hopper; at the bottom of the chutes the nuts are transferred to rotating heads by spring actuated plungers controlled by a foot treadle. The operator places two bolts in contact with the held-nuts and the spinning action of the rotating heads runs the nuts on the bolts to the nut thickness.

Belt drive for bench mounting, or direct connected motor drive for table use, as pictured on page 40, is supplied. This table arrangement is portable, the cross bars affording the means for lift-truck transportation.

The International Nickel Co. of Canada, Ltd., New York, had net profit in the third quarter of \$4,005,166, compared with \$3,773,130 in the corresponding 1933 period. In the first nine months of 1934, net profit was \$14,017,808, compared with \$5,636,019 in the corresponding three quarters of last year.

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No. 10



THE NEWS OF THE WEEK

British Steel Mills Running at Close To Capacity—Exports Very Heavy

LONDON, ENGLAND, Nov. 20 (*By Cable*).—Pig iron is firm with supply scarcely equal to demand, and further expansion is probable. Hematite is active and sales to Germany, Italy and Sweden are reported.

Less Continental competition in semi-finished steel is being encountered as British and foreign prices now are about equal. Active demand for bars and billets is reported and sheets are moving better. All around improvement in finished steel is noticed and mills are operating almost at capacity.

Demand for shipbuilding steel is better and large aggregate orders for rails, plates and sections are being taken.

The Steel Association is now controlling boiler plates and has fixed the home price at £9 7s. 6d., delivered, less 15s. rebate.

United Kingdom October exports of pig iron were 12,200 tons, of which none was shipped to United States.

Total exports of iron and steel were 221,000 tons.

Tin plate inquiry is good, but substantial orders for home and export are scarce. Mills are operating at 65 per cent of capacity and some may close down if early improvement is not forthcoming.

Continental iron and steel markets are more quiet, owing to the uncertain foreign exchange situation. United Kingdom buyers are holding off because of persistent Continental rumors of imminent English tariff increase. Semi-finished steel is fairly active, merchant steel more quiet and plates and sheets dull.

Steel Industry's Third Quarter Loss Was \$6.10 Per Ton of Ingots Made

AN average loss of \$6.10 on each ton of steel ingots produced in the third quarter was incurred by the steel industry, according to an estimate prepared by the American Iron and Steel Institute. In the second quarter there was an average profit of \$2.65 per ton produced.

The estimate is based on financial reports made public by 17 companies representing approximately 85 per cent of the steel ingot producing capacity of the country, indicating a total deficit for the entire industry during the third quarter of \$25,000,000. In the second quarter of the year it is estimated that the industry had a profit of \$24,600,000. For the first nine months the indicated deficit was \$8,300,000.

The second quarter's earnings were turned into losses in the third quarter by the sharp drop in demand beginning in July. Second quarter mill operations averaged 53.90 per cent of capacity compared with 24.14 per cent in the third quarter, a decline of 55 per cent.

Despite greatly lowered production in the third quarter, average hourly earnings for all steel company em-

ployees amounted to 72.7c., an increase of 3 per cent over the second quarter's level.

Complete reports to the American Iron and Steel Institute from companies with over 99 per cent of the country's steel capacity for the first half of 1934 show a return on investment during the period of only 0.86 per cent. This was entirely wiped out by the third quarter results when the industry's combined deficit was greater than its combined profit in the first half.

Total investment at the close of 1933 was \$4,848,010,935 and net income for the first six months after interest, depletion and depreciation was \$23,954,857. Dividends paid amounted to \$8,841,617, while payrolls totaled \$321,586,940. The rate of operations over the first half averaged 47.1 per cent.

The Link-Belt Co., Chicago, has acquired manufacturing and sales rights to the Modern Coal Burner which has been relinquished by the Modern Coal Burner Co., subsidiary of Peabody Coal Co., Chicago. This new stoker will be added to the Link-Belt line of stokers.

British Prices, f.o.b. United Kingdom Ports

Per Gross Ton	
Ferromanganese, export	£9
Billets, open-hrth.	£5 10s. to £5 15s.
Tin plate, per base box	18s. 2d.
Steel bars, open-hearth	£7 17½s.
Beams, open-hrth.	£7 7½s.
Channels, open-hearth	£7 12½s.
Angles, open-hearth	£7 7½s.
Black sheets, No. 24 gage	£9 5s.
Galvanized sheets, No. 24 gage	£11 5s.

Official Continental Prices, f.o.b. Continental Ports

Per Metric Ton, Gold £	
Current dollar equivalent is ascertained by multiplying gold pound price by 124.14 to obtain franc equivalent and then converting at present rate of dollar-franc exchange	
Billets, Thomas	£2 7s.
Wire rods, No. 5 B.W.G.	£4 10s.
Steel bars, merchant	£3 5s.
Sheet bars	£2 8s.
Plate, ¼ in. and up	£4
Plate, 3/16 in. and 5 mm.	£4 2s. 6d.
Sheets, ¼ in.	£4 7s. 6d.
Beams, Thomas	£3 2s. 6d.
Angles (Basic)	£3 2s. 6d.
Hoops and strip base	£4 2s. 6d.
Wire, plain, No. 8	£5 7s. 6d.
Wire nails	£5 15s.
Wire, barbed, 4-pt. No. 10 B.W.G.	£8 15s.

Nickel Company Adopts Pictorial Method For Presenting Comparisons

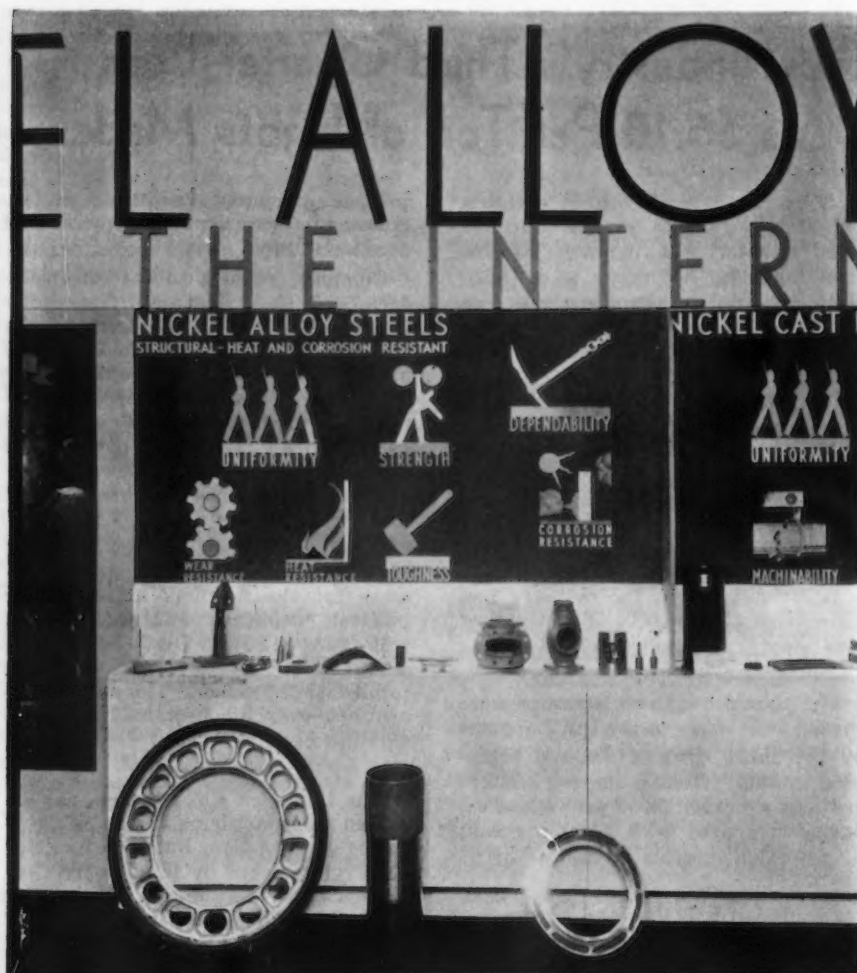
REALIZING the importance of social and economic relations and the need for a simplified method of depicting trends in these basic relationships, Prof. Otto Neurath, of the Social and Industrial Museum of Vienna, originated the so-called "Vienna Method," which he developed systematically in cooperation with the group of scientists, artists and teachers associated with the museum.

By this method data is presented to the eye as a many-colored picture, intelligent presentation being achieved through uniformity of illustrated reproduction and the assignment of definite meanings to the colors used. Where necessary, the story which the charts present as a simplified picture is supplemented by text and tables, but in all cases the picture portion is the principal feature.

The first publication in this country of this new type of chart was in the July, 1931, issue of *Fortune*. This material was prepared by Martin Jenter, of Jenter Exhibits, Inc. Later, the New York Edison Co. and Philco Radio used symbol charts of this type,

and the Museum of Science and Industry in New York has them on exhibition. It remained, however, for the International Nickel Co., Inc., in collaboration with Jenter Exhibits, to adapt, for the first time, the Neurath type symbols to display backgrounds for industrial expositions.

The first display background on which this type of treatment was used was exhibited the week of Oct. 2 at the National Metal Congress in New York. A picture of this booth appeared in *THE IRON AGE* Oct. 11, page 26-G. This proved so effective that a modified version was used two weeks later at the thirty-eighth annual convention and exhibition, American Foundrymen's Association, in Philadelphia. Encouraged by the favorable reception accorded these two exhibits, International Nickel now plans to display modifications of these panels at the power show to be held the week of Dec. 3 in New York and at the engineering display to be held the week of Jan. 21, 1935, at Detroit, in connection with the annual convention of the Society of Automotive Engineers.



44—The Iron Age, November 22, 1934

Abstract qualities such as uniformity, dependability, finish, machinability, density, pressure tightness, strength, toughness and resistance to heat, corrosion, abrasion and wear, because they exist in varying degrees in different materials, defy concise definition. Recognizing the imperative need for brevity in display, and having in mind the Chinese proverb to the effect that one picture is more effective than a thousand words, International Nickel set about to depict the combination of desirable properties inherent in such metals as nickel alloy steels, nickel cast irons, Ni-Resist, Ni-Hard, nickel brasses and bronzes, Monel Metal and rolled nickel.

The treatment adopted is shown in the accompanying illustration. It is interesting to observe how simply the various types of machinability and the varying orders of toughness and resistance to corrosion and wear associated with the different metals are brought out.

October Building Awards Highest Since March

OCTOBER contracts for all classes of construction were larger than for any month since March, according to F. W. Dodge Corp. The October total of \$135,524,800 for the 37 eastern States compares with only \$110,151,200 for September and \$145,367,200 for October, 1933.

Gains in construction contracts as contrasted with the totals for September were shown for each of the 13 Dodge districts, except upstate New York, where a relatively unimportant decline was reported. Increases in awards as contrasted with October, 1933, were recorded in the New England, Metropolitan New York, Middle Atlantic, Chicago, southern Michigan, St. Louis and Kansas City territories; losses were suffered in the upstate New York, Pittsburgh, Southeastern, Central Northwest, New Orleans and Texas territories.

Republic Merger Plan Approved by Majority

PROXIES representing more than 50 per cent of each class of stock of the Republic Steel Corp. have been received by the management's proxy committee to be voted in favor of the plan which will come up for ratification at the special stockholders' meeting to be held on Dec. 17.

The plan, among other things, provides for the acquisition by Republic of the properties of the Corrigan, McKinney Steel Co.; the acquisition of control of the Truscon Steel Co., and reclassification of Republic's capital structure.

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PERSONALS

WHITLEY B. MOORE, who has been on the engineering staff of the Timken Roller Bearing Co., Canton, Ohio, since the close of the war, has been made general manager of the industrial division. In 1921 Mr. Moore was transferred to the Pacific Coast in charge of sales in that territory, and three years later returned to Canton as assistant general sales manager of the industrial division. In 1930 he was made sales manager of the division. JOHN L. YOUNG, until recently district general manager in charge of the Pittsburgh office, has been advanced to the position of assistant general manager of the industrial division. HARRY D. ROBB, who has been with the Timken company since 1925, succeeds Mr. Young at Pittsburgh, and HARRY H. WOOD, who has been on the engineering and sales staff since 1929, has also been transferred to Pittsburgh as manager of the rolling mill division.

PAUL H. SHAEFFER, who has been identified with the progress and development in the alloy steel industry primarily through association with the Central Steel Co. and through United Alloy Steel Corp., now units of the Republic Steel Corp., has been appointed assistant general manager of sales of the Ohio Ferro-Alloys Corp., Canton, Ohio.

E. P. POLUSHKIN, formerly instructor in metallography at the Columbia University School of Mines, and lecturer on dental metallurgy at the School of Dentistry, has joined the staff of Lucius Pitkin, Inc., New York, as associate metallurgist, with particular reference to research and development.

A. H. TUECHTER, president, Cincinnati Bickford Tool Co., was elected president, and E. A. MULLER, King Machine Tool Co., Cincinnati, was elected treasurer of the Industrial Association of Cincinnati at a meeting in that city last week. MALCOLM MUIR, president, McGraw-Hill Publishing Co., New York, spoke on the NRA.

H. P. OWEN, formerly with R. H. Bacon & Co., Chicago, publicity counselors, has joined the sales and engineering department of the Ingersoll Steel & Disc Co., Chicago.

PETER G. DENNISON, who has been superintendent of the wire products division of the A. O. Smith Corp., Milwaukee, has accepted appointment as general manager of the Metal Spraying Corp., 3132 West Garfield Avenue, Milwaukee.

ERNEST M. ELKIN has been appointed manager of the law department of the Westinghouse Electric & Mfg. Co., East Pittsburgh. A native of Indiana, he attended George Washington University law school at Washington. He has been connected with the Department of Commerce, Department of Agriculture, and the Treasury.

HENRY J. ROSENKRANZ, formerly vice-president of Morey Co., and ALFRED J. WEISBECKER, formerly New York sales manager of Simmons Machine Tool Corp., have formed a partnership under the name of Rosenkranz & Weisbecker, 149 Broadway, New York, and will deal in new, used, rebuilt machinery and liquidation of surplus equipment.

K. G. PULLEN, mechanical engineer, Broken Hill Proprietary Co., Ltd., Newcastle, Australia, is visiting iron and steel plants of the country. He left Australia in April and has made a tour of Germany and Great Britain and plans to leave San Francisco, Dec. 12, for the journey home. He will be accompanied by L. P. ROSS, consulting engineer, New York.

JAMES D. PRICE, superintendent of the sheet mill of the Tata Iron & Steel Co., Jamshedpur, India, sailed Nov. 21 to return to India by way of England, and was accompanied by ARTHUR NORDQUIST, of the Flinn & Dreffein Co., Chicago, which is furnishing the furnaces for a sheet mill addition at the Tata plant to be erected under the direction of the Perin Engineering Co., New York, as engineer.

CHESTER H. LEHMAN has been appointed vice-president in charge of sales of Blaw-Knox Co., Pittsburgh. He previously had been secretary of the company, and sales manager. H. B. LOXTERMAN, who has been associated with the company since its inception 28 years ago, succeeds Mr. Lehman as secretary, and becomes a director to fill the vacancy of HOWARD SACHS, who has resigned.

OBITUARY

WAYNE RAWLEY, vice-president and director of the Blaw-Knox Co., Blawnox, Pa., died suddenly at Miami Beach, Fla., on Nov. 16. He was 56 years old. In addition to his connection with the Blaw-Knox Co., he was a director of the Union Steel Casting Co., Lewis Foundry & Machine Co., Pittsburgh Rolls Corp., National Alloy Steel Co., and other concerns.

PLINY E. HOLT, formerly chief engineer of the Holt Mfg. Co., Stockton, Cal., and responsible for much of the World War army tank development, died of heart disease in that city on Nov. 18, aged 62 years. He designed a 150-ton truck, several types of army tractors and a caterpillar gun mount. Recently he had been vice-president and chief engineer of the Caterpillar Tractor Co.

D. P. N. LITTLE, vice-president of the Los Angeles office of A. M. Castle & Co., died Oct. 25 at his home in Pasadena, Cal. He was a founder and partner in the heavy hardware firm of Little & Robinson, which later merged with A. M. Castle & Co.

HARRY ULYSSES MORTON, president of the Morton Mfg. Co., Chicago, manufacturer of railway appliances, died Nov. 11 at his home in River Forest, Ill. For 18 years before the organization of his own company in 1913, he was associated in an official capacity with the Pullman Co.

ARTHUR J. LIBERT, proprietor of the Libert Machine & Motor Supply Co., Green Bay, Wis., died Nov. 9, aged 56 years. During the past year, in addition to operating his own business, he also was general superintendent of the Hudson-Sharp Machine Co., Green Bay.

CORNELIUS M. HANLEY, retired steel superintendent, and for 30 years employed by the Republic Iron & Steel Co., died Nov. 13, after a long illness. Mr. Hanley was born at Bunker Hill, Ill., and lived for many years in East St. Louis, having gone to Chicago in 1910.

JOHN A. ANDREWS, of the Newport Rolling Mill Co., Newport, Ky., died on Oct. 13.

S. E. DOSTER, president of the Superior Steel Castings Co., Benton Harbor, Mich., died suddenly, Nov. 19, aged 51 years.

WILLIAM W. DARROW, president of the Camel Co., Chicago, manufacturer of railroad supplies, died suddenly, Nov. 18, while on a business trip in Philadelphia. He was 52 years old.

JOHN F. KELLY, managing director of the Association of Iron and Steel Electrical Engineers, and editor of the *Iron and Steel Engineer* since 1917, died at his Pittsburgh home on Nov. 16, aged 53 years. He had formerly been assistant superintendent of the electrical department of the National Tube Co. at McKeesport. He was a member of the American Iron and Steel Institute.



Labor Truce for Steel Under Discussion

Steel Labor Relations Board Quietly Trying to Bring Industry and Amalgamated Together—Wagner Promises Bill with Teeth

WASHINGTON, Nov. 20.—Reports that efforts to reach a truce between the steel industry and the Amalgamated Association of Iron, Steel and Tin Workers were deadlocked, the appointment of Francis Biddle, of Philadelphia, as chairman of the National Labor Relations Board and announcement by Senator Robert F. Wagner that a labor bill "with teeth in it" will be enacted by the new Congress were developments last week in the labor situation. Interest was heightened by secret conference on Thursday between William Green, president of the American Federation of Labor, and Mike F. Tighe, president of the amalgamated association.

For some time reports have been in circulation that, in line with the appeal of President Roosevelt for a capital-labor truce, negotiations to this end have been under way between the National Steel Labor Relations Board and the steel industry, with proposals coming both from the industry and the amalgamated. The discussions have been quietly conducted with no official statements made. Delay by the board in making decisions on hearings it has held as to elections at steel plants to determine representatives for collective bargaining is attributed to the negotiations. Inasmuch as no terms of settlement appear to have been reached it is reported that the matter may be laid before the President for action. The President is now in Warm Springs, Ga., where he will remain for about three weeks.

The nature of the proposals for a truce has not been disclosed. Organized labor is said to be insistent upon majority representation for ex-

By **L. W. MOFFETT**
Resident Washington Editor, THE IRON AGE

clusive bargaining. This principle was laid down by the National Labor Relations Board in the Houde Engineering Corp'n. decision, and Mr. Biddle, successor to Lloyd K. Garrison, who took over the chairmanship of the board yesterday, has said he believes in that principle. Actually, the ruling in the Houde case as to exclusive right of collective bargaining quotes verbatim from the President's executive order of June 28 in setting up the National Steel Labor Relations Board. However, the order likewise specifically provided that no individual employee or group of employees should be denied the right to present grievances, to confer with their employers, or otherwise to associate themselves and act for mutual aid or protection. It also provided for elections by secret ballot, including primary elections which employers had urged because of the charge that organized labor used coercive methods at open primaries.

Although the appointment of Mr. Biddle had been opposed by the Pennsylvania Federation of Labor, his statement that he proposes to pursue the policies of Mr. Garrison had a placating effect as did his declaration that the power of the board should be increased.

Coming at the same time was the statement by Senator Wagner, although it is not known that Mr. Biddle's idea of increasing the power of the board looks to the joining of

forces with the New York Senator. The latter is preparing to reintroduce his labor disputes bill, virtually without change. It was supported by organized labor and bitterly opposed by industrialist interests, including steel manufacturers. The Wagner joint resolution providing for labor boards was enacted instead. The original Wagner bill would have abolished company unions. Senator Wagner would not confirm reports that the new bill would incorporate the "majority representation" clause in the Houde decision. He said, however, he thought the new Congress would be less disposed to "obstruct" such legislation than the last Congress.

President Roosevelt never went on record for or against the Wagner labor disputes bill. It was the general understanding that the Administration was opposed to it and that it was responsible for the passage of the so-called compromise Wagner joint resolution. On that assumption it is held that the President would not get back of the labor disputes bill. It is claimed that to do so would be entirely out of keeping with the plan of the Administration to cooperate more closely with industry for recovery.

Attention also has been directed to the fact that Secretary Roper, in a radio broadcast Nov. 8, sounded a principle that, while somewhat vague, appears to be in direct conflict with the views of organized labor and in line with the industrial view. He said that employer and employee are equally responsible to the public. Coming from this source the statement was taken to reflect the White House view. The statement excited wide interest with resulting reported demands for some 7000 copies of the

address. Secretary Roper would not enlarge on the remarks to indicate what sort of responsibility he had in mind. To suggestions that it indicated that organized labor should be required to incorporate its unions no confirmation was forthcoming.

Equal Responsibility

Mr. Roper made the statement after emphasizing the point that citizens cannot properly demand rights unless they are willing to assume the responsibility inherent in those rights.

"To illustrate," said Secretary Roper, "if we wish to exercise the right of not working, that is to strike, this right should be safeguarded; but in so doing we should defend the right not to strike, that is, the right to work without molestation. In the relationships which develop between employer and employee, it is mandatory upon both employers and employees to live up to their part of the agreements determined upon. Each must be just as responsible to the public and must be held to just as strict accountability as the other. This comparison serves to illustrate the vital necessity of a balanced analysis and viewpoint which takes into consideration both the rights and responsibilities of all citizens and the economic units or interests which they represent."

Organized labor is reported to have strongly resented the Secretary's remarks.

More Power for Labor Board

Whatever may be done with regard to the Wagner labor disputes bill, it is believed the next Congress will be urged by the National Labor Relations Board to increase the latter's power. Mr. Biddle's conviction that the board's power should be increased is shared by the two other members of the board, Dr. Harry A. Mills and Edwin S. Smith, and therefore the board is expected to ask for such legislation. It is thought it will take the nature of authorizing the board to subpoena witnesses, compel testimony and turn over to the courts firms or individuals refusing to abide by the board's decisions. It will be recalled that the board recently reported to President Roosevelt that "the most serious difficulties which we face flow from the fact that the board has no power (except to a limited extent in ordering elections) to issue subpoenas or to enforce its orders."

It may be accepted as a certainty that if the power of the National Labor Relations Board is strengthened that the power of the National Steel Labor Relations Boards and all other labor boards will also be strengthened.

Mr. Biddle is a member of a prominent Philadelphia family and is 48 years of age. He has been a member of the Philadelphia County Board of Law Examiners for the past

10 years, was vice-president of the Public Education Association in 1913 and 1914 and was vice-chairman of its legislative committee which drafted the vocational education act of 1913 and the child labor amendments in 1915. He was first assistant attorney of the eastern district, Philadelphia,

from 1922 to 1926, organized the Philadelphia branch of the Foreign Policy Association in 1928 and became its chairman in 1931. He is a great-grandson of Edmund Randolph, first attorney general of the United States and was graduated from Harvard in 1911.

NRA Begins Code Simplification And Rationalization Program

WASHINGTON, Nov. 20.—Embracing all of the existing 530 codes, NRA has entered upon a far-reaching effort to "rationalize and simplify" wage and hours provisions. Subsequently a like attempt will be made with regard to trade practices. These comprehensive moves look to greater uniformity in provisions covering hours, wages and trade practices. Being only in the preliminary stage it is not known what success may result from the task but it is hoped at least to bring about greater simplification and uniformity of the provisions and not only reduce the work of code administration but likewise cut down costs both for industry and NRA and develop better compliance.

The study under way with regard to wage and hours provisions, which has no relation to section 7-a (collective bargaining) of the Recovery Act, has been undertaken after the assembling of an NRA staff of material reflecting the various intricate problems that are to be met. The same line of study will be taken when efforts are made to simplify trade practice provisions.

Problems bearing upon the wage and hours include such matters as competition within related industries, differentials as to geographical areas and sex, and overlapping of code provisions where single concerns operate under different codes.

After preparing the material, NRA has turned it over to its deputy administrators. They have been told that in approaching code authorities and making investigations that the "sky is the limit" in preparing reports and submitting recommendations.

Large Volume of Data Prepared

The volume of data assembled has been prepared on analysis sheets and merged into related groups. Comparative sheets showing wages and hours provisions for codes in such groups reflect the varying hours and wages paid, while a so-called "complexity" sheet shows the difficulty that will be faced in ironing out differences, where that is held to be desirable. It is

realized, however, that complete uniformity is not always either possible or desirable. Another sheet shows the trend toward uniformity and is followed by still another, called a "hypothetical" sheet, with arrangements looking toward greater uniformity but providing enough elasticity to safeguard labor. It is what might roughly be called a mark to shoot at. An additional sheet shows the lack of uniformity in related groups and the possibility of merging the affected provisions. A map shows geographical differentials, mixed with population and sex and is designed to visualize what might be done in case of shifts of areas and revision of differentials, as well as the possibility of merging codes.

Deputy administrators are to report results of their work with recommendations to divisional administrators whose task will be that of coordinating related groups and administering codes. Finally it is proposed to select a code administrator to be placed in charge of the entire grouping.

Meanwhile NRA is receiving suggestions for closer coordination of local code administrative agencies. These suggestions have been received from the field and were relayed to group conferences of local code authorities in 17 major centers. The plan for closer coordination of code administration, according to NRA, is particularly well illustrated by the one devised at Seattle, Wash., where local code authorities meet as a group at regular intervals for the discussion of mutual problems, and in Boston, which has selected a committee of 11 and considered plans for concentrating local code agencies. The NRA hopes to formulate a program to increase economy and efficiency in local code administration as the result of a canvass by Deputy Administrators G. deFreest Larner, Irwin S. Moise and Robert K. Straus of code authority sentiments. From all the suggestions received an outline to be used as a basis for discussion has been evolved and has been laid before regional group conferences.

This outline takes up one possibil-

ity, the concentration of all local code authorities, with 11 divisional offices, one for each industry or trade groups into which the internal organization of NRA is divided. These are food, textiles, basic materials, chemicals, manufacturing, equipment, construction, public utilities, graphic arts, recreation and distribution.

It is suggested that each divisional office have an executive secretary to handle the office routine of all local code agencies in the particular division. Complaints received under any code in that division, it was pointed out, could be docketed in the division office and set for consideration by the particular local industry code authority. It was stated that if such suggestions were adopted, NRA could assign special personnel in each state office to contact, assist and coordinate the work of local code administration.

Intensified effort toward developing compliance is seen as a part of the moves being made by NRA. With this end in view, G. Stanleigh Arnold, San Francisco, on Nov. 22 will take up work as a special assistant of the Department of Justice to prosecute code violators. His appointment was announced last week by Attorney General Cummings who said Mr. Arnold would maintain offices both at NRA and the Department of Justice to expedite court action against offenders.

It is thought the purpose is especially to proceed against code chiselers in line with action recently indicated by President Roosevelt when he stated that he hoped to correct a situation under which chiselers often were unmolested for six months or more with the result that they found violation of codes to be financially profitable. The appointment of Mr. Arnold apparently followed a change in former plans to handle code compliance exclusively under the Department of Justice and to mean instead cooperation between that department and NRA.

Submarine Propelling Machinery Ordered

WASHINGTON, Nov. 20.—Contracts for five sets of propelling machinery for five of the six submarines being constructed under the 1934 Naval program have been awarded. Three sets went to the Winton Engineering Corp., Cleveland, for \$2,142,764.72, to be used in three submarines under construction by the Electric Boat Co., Groton, Conn. Fairbanks, Morse & Co., Chicago, were awarded a contract for two sets for \$1,805,380, to be used in two submarines being built at the Portsmouth, N. H., navy yard. Further bids will be opened Nov. 27 for the propelling machinery for the sixth submarine now building at the Mare Island, Cal., navy yard.

Business Advisory and Planning Council To Meet With President

WASHINGTON, Nov. 20.—The Business Advisory and Planning Council has announced that it will consult with President Roosevelt, probably at the time of the council's next meeting in December, to discuss problems of current importance with which it is dealing. The council was created in June, 1933, by Secretary Roper, in order that the Department of Commerce might avail itself of the experience and opinions of representative business leaders in the United States. The purpose of the council is to advise with the Secretary of Commerce on departmental affairs and to present the "business man's point of view" on questions of national importance through proper administrative channels.

Especially active at the present time is the committee on social legislation, under the chairmanship of Ralph E. Flanders, president, Jones & Lamson Machine Co., Springfield, Vt., which is seeking to formulate unemployment insurance legislation. The committee is working in close cooperation with the technical board of the President's Committee on Economic Security, in order to make recommendations of business concerning legislation on unemployment reserves. The President's Committee on Economic Security at its meeting here last week discussed this and other social legislation.

The council also went over a number of subjects but took no definite action. It had before it, but did not pass on, the report of Dr. Theodore N. Beckman, Ohio State University economist, concerning loans to small industries. Doctor Beckman was placed in charge of the survey made by the small industries committee of the council.

The council elected H. P. Kendall, president, Kendall Co., Boston, as president, to succeed S. Clay Williams, Winston-Salem, N. C., who resigned because of pressure of duties which he has assumed as chairman of the National Industrial Recovery Board. Mr. Kendall was succeeded in his former position as first vice-chairman of the council by Walter C. Teagle, president, Standard Oil Co. of New Jersey. Ernest G. Draper, vice-president, Hill Brothers Co., New York; Harold C. Smith, president, Illinois Tool Works, Chicago; Gerard Swope, president, General Electric Co., New York, and W. J. Vereen, president, Riverside Mfg. Co., Moultrie, Ga., were elected for one year's service as members of the council's executive committee.

No determinations were reached at the meetings of the committee on economic security. It found itself some-

what restricted by the President's address, which was taken to indicate that he proposes to confine legislation at the next session of Congress to unemployment insurance. Discussion was carried on, however, concerning old age pensions and other related subjects. The President's proposal is for a Federal-State plan and declared that the plan "must be financed by contributions, not taxes." His views apparently ran counter to those of some Administration representatives. The plan for contributions rather than taxes was taken to mean contributions by both employers and employees. Under such a plan the reserve would be created from funds directly contributed by those actually receiving the benefits as against suggestions that have been made to force the burden upon wealth by means of higher inheritance levies. States also would be called upon to bear their part along with the Federal Government. The Wagner-Lewis bill embraces only partially this plan. That measure would levy a Federal tax on employers not participating in compulsory State insurance plans.

Mr. Swope and other members of the advisory council expressed pleasure at the way in which the President approached the subject. Mr. Swope said he believed the President's speech showed that the Administration desired a "practical" social security program. On the other hand, President Green of the American Federation of Labor is said to be prepared to oppose legislation for the contribution system and to urge the federation's proposal of a payroll tax of 3 to 5 per cent on employers.

The general belief is that a plan, most likely along the line suggested by the President, will be enacted into legislation at the forthcoming session of Congress.

Non-Ferrous Ingot Research Helpful

WASHINGTON, Nov. 20.—The work of the research associate supported by the Non-Ferrous Ingot Metal Institute at the Bureau of Standards is an example of the value of these cooperative researches in which the bureau and important industries work together for the solution of basic problems, according to Lyman J. Briggs, director.

The work of this particular associate has received wide attention in this country and abroad and is credited with advancing the non-ferrous ingot metal industry to a higher plane than

formerly. Upon invitation from the program committee of the American Foundryman's Association, a paper was prepared which was presented as the official exchange paper before the Institute of British Foundrymen last spring.

As a part of the discussion of this paper, a British non-ferrous alloy authority particularly raised the question regarding the action of sulphur. He pointed out that the usual absorption of sulphur was through sulphur oxide gases in the melting furnace and not sulphur in its elemental form.

In order to study this possibility a series of melts was made in which the molten metal was treated with sulphur dioxide. The maximum amount of sulphur absorbed by this method was 0.75 per cent, efforts to obtain a melt containing 1.00 per cent sulphur being unsuccessful.

After comparing data on these tests with those obtained in the previous study using stick sulphur it may be stated that the difference in the effect on the physical properties of the alloy is small. In general, sulphur added as sulphur dioxide gas appears to have a less injurious effect on the physical properties of the alloy than the same amount of sulphur added in stick form.

Chamber of Commerce to Cooperate with President

WASHINGTON, Nov. 20.—The program of the United States Chamber of Commerce to go along with the New Deal, as announced by the chamber's directors, promises closer cooperation between the Roosevelt Administration and business than has been heretofore evident. It was indicated that both business and the Administration have revised their policies partially in order to work toward recovery now that elections are over and the need of stimulating industry and employment and of reducing huge Government expenditures for relief has become more pressing.

The action was taken in the form of a resolution, but of course is qualified with the provision for a "common agreement upon a program which will be fair and just to all and which will accelerate efforts toward recovery." To this end Henry I. Harriman, president of the chamber, appointed a committee to report to the directors at their next meeting or to the executive committee. The committee is headed by Silas H. Strawn, Chicago, former president of the chamber.

Hermanson-Nortman Co., Milwaukee, recently incorporated by Sune Hermanson, Arthur Davidson, Walter Nortman and George F. Nortman, will specialize in treating metals under license from Parker Rust-Proof Corp., Detroit. A shop has been equipped at 401 South Seventh Street.

Malleable Iron Industry Perfecting Cost Accounting System—Other Code News

WASHINGTON, Nov. 20.—The National Industrial Recovery Board has extended for 60 days, from Oct. 29, 1934, the trial period granted the code authority for the malleable iron industry to perfect a cost accounting system, a schedule of fair and reasonable costs of production in the industry for the various types of malleable iron castings produced, and a procedure for making such a schedule effective. Two previous stays of 90 days each were granted, the second of which expired on Oct. 29.

COPPER, BRASS, BRONZE AND RELATED ALLOYS

Suggestions or objections concerning proposed credit terms submitted by the divisional code authority for the copper, brass, bronze and related alloys trade, a division of the wholesaling or distributing trade, and to be used as a standard by members of the trade, must be made before Dec. 3, to Deputy Administrator Frank H. Crockard.

ROAD MACHINERY MANUFACTURING

Members of the road machinery manufacturing industry had little difficulty in reaching a satisfactory understanding on a method of "value determination of re-sale values," and rules and regulations governing second-hand or old equipment, at a hearing conducted by Assistant Deputy Administrator John L. Murrie, Nov. 19.

William Ogden, Chicago, secretary of the co-ordinating agency of the industry, presented price schedules which he said had been carefully worked out on a percentage basis. The schedules, he said, were prepared upon actual transactions in items that had been traded in. In fixing re-sale value, the cost of overhauling and transportation to the plant where the work was done were considered, together with 20 per cent for re-sale expense.

The question was raised by John L. Connors, of the Gallion Iron Works & Mfg. Co. of Gallion, Ohio, as to whether tractors were included in the list of old equipment embraced in the re-sale valuations. R. S. Denvir, for the legal division of NRA, expressed the opinion that this item was not definitely specified.

STAPLING MACHINE

The machine-applied staple and stapling machine industry has filed a budget total of \$14,960 for July 1, 1934, to June 16, 1935. All members of the industry shall be assessed one-half of one per cent of net sales for the first six months of 1934. Objections must be filed before Dec. 3, with Deputy Administrator H. Ferris White.

CAN MANUFACTURING

Suggestions or objections concerning a proposed amendment to the code of fair competition for the can manufacturing industry permitting the code authority to prepare a budget and basis of contribution must be submitted before Dec. 4, to Deputy Administrator H. Ferris White.

CODE AUTHORITY MEMBERSHIPS

The NRA has announced its recognition of the following code authority memberships:

Electric Hoist and Monorail Manufacturing Industry—(Division of Machinery and Allied Products Industry)—A. F. Anjesky, Cleve-

land Tramrail Division, Cleveland Crane & Engineering Co., Wickliffe, Ohio; J. P. Lawrence, American Monorail Co., Cleveland; Roy Loudon, Loudon Machinery Co., Fairfield, Iowa; F. F. Seaman, Robbins & Myers Sales, Inc., Springfield, Ohio; R. T. Turner, Shepard Niles Crane & Hoist Corp., Mountour Falls, N. Y.; J. G. Worker, American Engineering Co., Philadelphia; N. A. Hall, Electro Lift, Inc., New York.

Scientific Apparatus Industry—Carl S. Hal-lauer, Bausch & Lomb Optical Co., Rochester, N. Y.; R. E. Gillmor, Sperry Gyroscope Co., Brooklyn; Morris E. Leeds, Leeds & Northrup Co., Philadelphia; Henry W. Kimmel, Taylor Instrument Companies, Rochester; W. L. Huff, Minneapolis-Honeywell Regulator Co., Minneapolis; I. L. Nixon, Bausch & Lomb Optical Co., Rochester; Carl Amend, Eimer & Amend, New York; C. G. Campbell, Kewaunee Mfg. Co., Kewaunee, Wis.; Karl Keller, Keuffel & Esser Co., Hoboken, N. J.; Verner F. Davis, Atlas Valve Co., Newark, N. J.

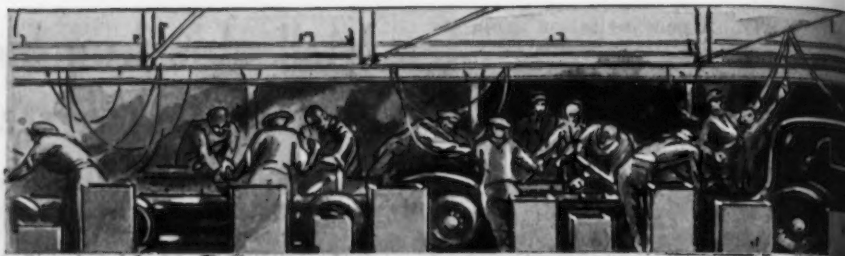
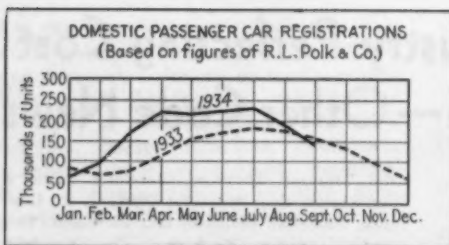
Electro-Plating and Metal Polishing and Metal Finishing Industry—John E. Esposito, Progressive Plating & Enameling Co., Oakland, Cal.; W. E. Carr, Carr Plating Co., San Antonio, Tex.; William Shephard, Shephard Plating Co., Racine, Wis.; E. A. Rottman, City Plating & Mfg. Co., St. Louis; H. C. Simmons, Simmons Plating Co., Atlanta, Ga.; R. T. Marshall, Worcester Brass & Electro-Plating Co., Worcester, Mass.; Phil Sievering, Philip Sievering, Inc., New York; F. F. Pierdon, Art Metal Finishing, Washington; Albert Kriese, Climax Machinery Co., Indianapolis; H. M. Karet, Keystone Chromium Corp., Buffalo; James E. Nagle, James E. Nagle & Sons, Toledo, Ohio; Leo D. Jensen, Chromium Corp. of America, Chicago; Edward Hodeker, Hodeker Brothers, Newark, N. J.; Arthur Lyons, Hugh Lyons & Co., Lansing, Mich.

Simplified Practice In Heating Boilers

WASHINGTON, Nov. 20.—A proposed simplified practice recommendation covering steel horizontal firebox heating boilers has been mailed to all interests in the industry for their consideration and written approval, according to the division of simplified practice, Bureau of Standards. This recommendation, which was approved at a general conference held in Cleveland on June 5, lists 19 sizes of boilers ranging from 1800 to 35,000 sq. ft. of steam radiation and from 2880 to 56,000 sq. ft. of water radiation for hand firing.

The recommendation includes heating surface and grate area for each size of boiler. Other information includes furnace volume for oil, gas fired, or bituminous coal stoker fired boilers, together with size of outlets and number and size of safety valves.

The recommendation, if approved by the industry, will be issued as simplified practice recommendation RI57 and will be effective from July 1, 1935.



THIS WEEK ON THE

Car Manufacturers Prepare for Larger Sales as Markets Expand

DETROIT, Nov. 20.

THE economic crepe-hangers are at work trying to explain why the automobile industry can't possibly do better in 1935 than in 1934, despite the fact that it is ending the second consecutive year of marked improvement over the performance of the preceding year. Alexander Hamilton Institute, if reported correctly in the press, is the latest recruit to the ranks of those who are chanting a dirge over the industry's hopes. It records its conviction that automobile makers will be doing well in the coming year to hold their own as against their showing this year. It cites several reasons for this opinion which in theory sound good.

However, those who are living with the industry from day to day know that it has a way of doing the most surprising things which often put to rout predictions based on past experience. When others fold up their tents and beat a retreat in the face of adversity, motor car companies go forward with a smashing attack. That is the explanation why the industry has made material progress back to normalcy (if anyone knows what normalcy is) in the last two years. If the automobile industry had been as timid about putting its best foot forward as industry in general has been, the country economically would be far worse off today than it is.

Assemblies in the United States and Canada (the basis on which the automobile industry always figures) in the first nine months of 1934 totaled 2,493,276 units. With October estimated at 125,000, November at 70,000 and December at 125,000, output this year should be around 2,815,000 units. This is a 40 per cent gain over the 1,985,909 units produced in 1933 and almost double the 1,431,494 units

turned out in the depression low year of 1932. It even is a better performance than in 1931, when 2,472,359 cars were made.

Trucks Show Big Gains

Commercial cars and trucks have registered the most spectacular gains. Domestic registrations in the first nine months of this year amounted to 310,249 units, as against 183,540 units in the similar months last year. R. L. Polk & Co. estimate October truck sales at 40,000 units, compared with 28,058 units in the corresponding month a year ago. With the final quarter's retail deliveries conservatively figured, the year's total will be 390,000 units, or 63 per cent better than the 245,869 units in the preceding year.

Passenger car sales for the year are put at 1,865,000 units, whereas in 1933 they were 1,493,794 units, an increase of 24 per cent. While the improvement in sales this year has been of gratifying proportions, sales executives privately agree that the volume would have been larger except for one factor—the rise in retail prices at the beginning of the second quarter. Although the old prices were restored within a month or two, the advance acted as a brake on sales momentum and the pace promised prior to the boost in prices never was attained. There is little doubt that this error cost General Motors and Chrysler thousands of sales from April on.

What of 1935? There is scarcely a car manufacturer who doesn't say, "The industry will build a minimum of 3,000,000 cars next year." That is considered a rock-bottom figure. The usual estimated gain is 15 per cent, thus yielding a production of around 3,250,000 units.

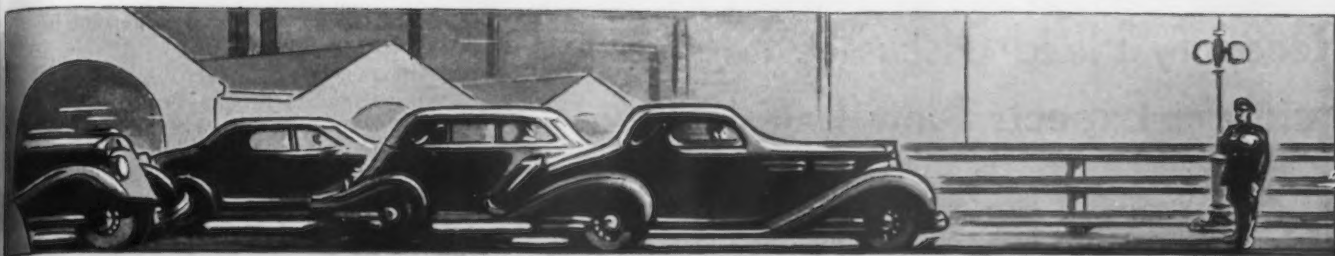
What is the basis for such confidence? Well, it is obvious this year

that a substantial percentage of car buyers were people with money who were purchasing a car in a lower price field than that to which they had been accustomed. The low-price car makers, for example, sold a much larger percentage of de luxe or master cars than of standard models, although the latter cost considerably less. Price didn't seem to be a major factor. It was only after one got into the higher brackets that price became paramount.

The economist of a leading automobile company says that the automobile industry can't expect to prosper as it should until two important classes of buyers are back in the market—the farmer and the factory worker. In the last half of this year the farmer has become a more active prospect for car sales. His total income this year, despite the drought, is reported to be over one billion dollars more than in 1933. Largest spurts in car sales, from the standpoint of percentage, have been in agricultural areas. The outlook for fairly good crops in 1935 is favorable. Three high General Motors officials have just returned from a tour of the farming districts in the Mississippi Valley feeling optimistic about sales prospects there next year.

Then the factory worker and the so-called white collar class dependent on industry for a living are beginning to show signs of financial recovery. Their incomes haven't come back as fast as those of the farmers, but the trend has been in the right direction. The best evidence is the growing volume of time payment sales of new cars and the relatively tight market for good used cars. The automobile people, of course, have less hope of a strong sales comeback among industrial workers than among the farm population.

However, it is the first faint glimmer of recovery on the part of these



ASSEMBLY LINE

two classes that has made the low-price car maker think more about emphasizing economical transportation in 1935. These two classes have to consider nickels and dimes, in many cases, and a difference of \$25 or \$50 means much to them. Hence low prices are likely to be dangled in front of their eyes as an inducement to purchase new cars. The entire automobile industry is conscious of the fact that prices must be low if the market for cars in the immediate future is to be expanded.

The automobile industry's conviction that 1935 will bring an upswing from the 1934 level has been further strengthened by the aftermath of the recent elections. A rapprochement between the Roosevelt administration and the country's business interests is under way and promises to contribute perhaps more than anything else to industrial recovery. Detroit is not slow to appreciate the significance of this development, which, if nothing happens to spoil it, should help in building up a good market for cars next spring and summer.

Motor car manufacturers are not being carried away by wild, unreasonable optimism in surveying the prospects for the coming year. They spend money freely only when they think that they have a good chance of getting it back. Their actions speak louder than their words. Ford is making large capital outlays to increase by one-third the productive capacity at the Rouge plant. Oldsmobile is reported to be doubling its capacity at a cost of \$2,500,000. Chevrolet, anticipating a better year in 1935 than in 1934, is reserving for its own use certain plant space formerly employed in fabrication of Pontiac parts. Pontiac and Buick are divorcing their sales organizations, which have been interlocked for the last two years. Packard is reequipping its plants to build a new car, making expenditures of over \$6,000,000 for this purpose.

Others Wait on Ford

When it comes to the setting of prices for 1935, car makers are shying away from the matter. It appears to be a case of "You first, my dear Alphonso," with Mr. Ford being unanimously voted by the industry as the

By **BURNHAM FINNEY**
Detroit Editor, **THE IRON AGE**

ideal person to be cast in the role of Alphonso. If he "puts a price" on his new car, as his competitors think he will, Chevrolet and Plymouth seem to be ready to push their standard models into the foreground. If the price stays where it is, they will switch their attention to the master and de luxe series.

Chevrolet is in no hurry to clean up assemblies of current models. It still is said to have some 50,000 standard and truck units to build by the middle of December before it stops 1934 production. It takes the attitude, "Why stop making present models so long as we can sell them?" Anyone would have a hard time disputing that point. Last week Chevrolet ran its ten millionth car off the assembly line at Flint and likewise celebrated its twenty-third birthday. Of the ten million, half are still in operation and 4,825,202 have been sixes manufactured since November, 1928. Chevrolet is practically assured of closing the year in first place again in total registration of passenger cars and trucks, making six out of the last eight years in which it has led the industry. The Chevrolet gear and axle plant and forge plant are doing little until operations on new models start around Dec. 1.

Dodge to Begin Shipping Cars

Dodge has made about 30 cars to date and this week will begin shipping to dealers. Plymouth is working feverishly on its reconstructed plans for 1935, with some departments said to have operated over the last weekend. Now that Dodge and Plymouth have tossed aside knee action, as first reported in this column, General Motors is said to be preparing to feature knee action more than ever on all cars except the Chevrolet Standard series. It will say that competitors couldn't afford to use it, taking it off to reduce costs of manufacturing. Realizing that Fisher Body is trending toward all-steel construction of

bodies, Chrysler divisions will emphasize their years of experience in building all-steel bodies, while competitors, inexperienced at making them, are just coming to them. Chrysler Corp. is adopting for all its cars the controlled ventilation system installed this year on Ford V-eights. To secure ventilation by this system, the car rider turns the ratchet until the window is closed and then rolls back a short distance, opening a space at the front of the window.

Tentative production schedules continue to be meaningless. It is the general feeling in Detroit that all three of the major companies—Ford, Chevrolet and Plymouth—will be slow in getting started. With most makers the matter of securing an adequate supply of bodies will be of serious concern. Briggs, for instance, is said to be working some departments six days a week on Ford business. Unquestionably, though, Ford has the edge and a public announcement is anticipated before the end of December. Hudson-Terraplane will not show its cars until after Jan. 1.

Steel Releases Improving Slowly

Steel releases are increasing slowly, with more tonnage coming from parts makers than from car manufacturers direct. In some cases automobile companies haven't yet decided on sheet sizes for new models. In this connection it will be recalled that at the end of the second quarter Plymouth bought a substantial tonnage of sheets and other steel products suitable for use on 1935 models so that much of the steel for the first production run has been in the Plymouth plant for months.

The steel industry at present is being deprived of tonnage from Ford suppliers, especially those making forgings, because of the extension of Ford's long established practice of asking its vendors to take steel from Ford's steel mills. With upward of 150,000 tons stored in the Rouge yards, Ford's insistence on suppliers getting their steel there if the necessary analyses and sizes are available is a natural development. However, this policy is being felt more severely because of the relatively small consumption of steel than it would be if demand expanded materially.

Recovery Head Discusses NRA's Future — Expects New Legislation

WASHINGTON, Nov. 20. — S. Clay Williams, chairman of the National Industrial Recovery Board, said at a press conference yesterday that he thinks "it would be perfectly miraculous if the recovery act is extended in its present form" by the forthcoming Congress.

He said that the board is not preparing recommendations to be made to Congress but that he had no doubt that when the time arrives for Congressional action the NRA will have opinions as to what should be done. He said he assumed the Congressional committees which will consider NRA legislation will call members of the board before them. Mr. Williams said, however, that he hopes Congress will retain gains made under NRA as to such matters as wages and hours. Studies now being made by NRA as to wages, hours, and trade practices, he declared, no doubt will be helpful in reaching conclusions as to the new legislation.

There is no machinery set up for NIRB to make recommendations, it was pointed out, but it was stated that authorization to do so rests with a committee of the National Emergency Council, headed by Donald Richberg and also including Secretary Perkins, Secretary Ickes, Secretary Wallace, Attorney General Cummings and Chester Davis. This committee also is authorized to make recommendations with regard to coordination of the various emergency agencies of the Government.

NIRB Making Studies

The NIRB, which has suspended the former practice of Gen. Hugh S. Johnson of holding regular press conferences has been making studies of numerous problems, Mr. Williams said, and has put in much time on the service code problem. This latter problem has been given particularly intensive study and it is expected that NRA will make a decision on it within the next 10 days.

The most difficult problem, Mr. Williams said, is that of compliance and to this end W. H. Davis, former head of the compliance division, has been recalled to help in solving the question. He announced that W. H. Rosenblatt has been put to work on the subject and that the latter probably will give up entirely his work on the motion picture code and devote his exclusive efforts to work on compliance questions. Further efforts to develop greater compliance have been made through the selection by the Attorney General of S. A. Arnold, who will work with NRA, and cooperating in the work will be the Federal Trade Commission.

"We are going to push compliance just as far as we can," said Mr. Williams.

Automobile Code a White House Matter

He stated that handling of the automobile code, which recently was renewed without change until Feb. 1, is a White House matter. Mr. Williams said it is not his understanding that the NIRB has been given any instructions in connection with handling the code. He added further that he does not know whether any steps have been taken to call a conference on the subject, referring to the letters of the President to President Alvin Macauley of the Automobile Manufacturers Association and President William Green of the American Federation of Labor in which the President said he would be glad to confer with them regarding further action on the automobile code.

Mr. Williams said that the NIRB is not preparing to take any action with regard to the decision of the National Labor Relations Board in the Houde Engineering Corp. case.

The steel fabricators' code, which has not been put into effect but has been suspended several times, Mr. Williams said, has been referred to the NRA advisory council. The council is made up of one member each from the NRA Consumers' Industrial and Labor Advisory Boards.

Mentioning the durable goods industries as those where the largest unemployment exists, Mr. Williams said the situation is not susceptible to action by NRA but that personally he has more faith in reemploying idle workers through the housing program than in any other line.

Steel Labor Board Issues Two Orders

WASHINGTON, Nov. 20.—Indications that the National Steel Labor Relations Board is attempting to arrange a truce between the steel industry and the Amalgamated Association of Iron, Steel and Tin Workers are believed to be seen in two orders issued yesterday by the board.

One order, bearing on a petition for an election at the MacDonald and Duquesne plants of the Carnegie Steel Co., asked the company and the union workers to indicate a convenient time for taking evidence on the interstate character of the company's business and then proceeded to state that since the hearings in Pittsburgh, Oct. 2 and 3, "numerous mediatory efforts have been made to reach an accord and a

satisfactory working arrangement between the parties."

The other order, relating to alleged discrimination by the Republic Steel Corp. as a result of union activity at its Warren, Ohio, plant directed the parties to the complaint to report what use, if any, "has been made of the opportunity afforded by the board to adjust the controversy by direct negotiations between the company and the complainant." The order was issued, said the board, to the end that "decisions may be issued in the cases still unsettled."

J. & L. Hearing

PITTSBURGH, Nov. 20. — Spokesmen for the Jones & Laughlin Steel Corp. at the two-day hearing before the National Steel Labor Relations Board at Pittsburgh last week stated that the company never would countenance a closed shop union contract. At the same time, the company said that it would receive any representative of its employees at any time for discussion of matters of mutual concern. This attitude summarized the company's position in regard to complaints filed by the Amalgamated Association of Iron, Steel and Tin Workers, charging coercion and intimidation of union members at the company's Aliquippa, Pa., works in violation of Section 7-A of the National Industrial Recovery Act. The company denied the union charges of physical duress and the shadowing of union men by company police.

No decision on the hearing was given by Judge Walter P. Stacy, chairman of the board. Another hearing will be scheduled at a later date on a petition of the amalgamated association for a Government-supervised election of employee representatives for collective bargaining in Jones & Laughlin Steel Corp. plants.

Scrap Stronger At Boston

BOSTON, Nov. 20.—Bundled skeleton and steel turnings have been advanced another 25c. a ton, making a total advance of 50c. within a fortnight. At the new prices brokers have taken several carlots for Pittsburgh district delivery, the first volume transactions noted in many months. Despite a further rise in No. 1 heavy melting steel prices at Pittsburgh, they are still out of line with the local export market. The American Steel & Wire Co., Worcester, Mass., has not met the export price, consequently scrap from that territory continues to flow to seaboard. The market here for export is active, with boats leaving almost every week and in some cases two boats, shippers being sold ahead for the remainder of this year at least. A boat loading at Providence, R. I., has been held up due to the shipper being unable to secure round tonnages of scrap.

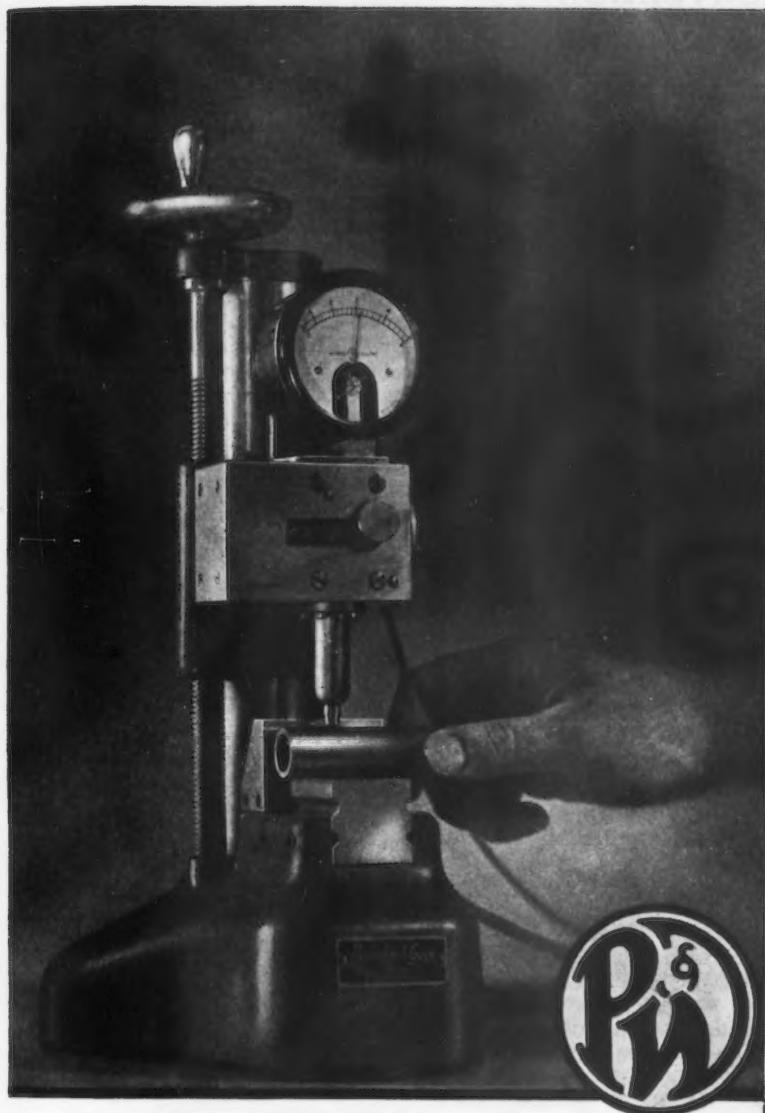
INDUSTRY'S NEWEST and MOST SUCCESSFUL INSPECTION TOOL » »

Until now many of these features at best have been a laboratory problem, out of shop reach. Today these inspection improvements not only are very practical, but outstandingly successful in the shop.

The Electrolimit Gage contains no gears, racks, pinions, nor levers with their attendant inaccuracies. No type of gage is affected less by hand usage, vibration and temperature changes. It is equally efficient in a temperature controlled laboratory or attached to a ponderous rolling mill.

The automotive industry is taking advantage of Electrolimit gaging possibilities. Wrist pins, pistons, both connecting rod bearings, cylinder bores, and other parts are being inspected to the finest limits, and assembled almost perfectly as a result. Sheet and strip metal is being rolled to accurate thickness under continuous Electrolimit guidance. Production on intricate and accurately fitted mechanisms such as electric refrigerator units, business machine parts and many others is being governed so that final assembly becomes a smooth and certain operation. The performance of the Electrolimit gaged product is superior because of the resulting more accurate assembly.

Our engineers will be glad to go over your work and give you the complete story of Electrolimit gaging as applied to your particular problems. Write to Pratt and Whitney Company, Hartford, Connecticut, U. S. A., for descriptive literature.



THE PRATT & WHITNEY ELECTROLIMIT GAGE

WITH ELECTRICAL PARTS MADE BY GENERAL ELECTRIC COMPANY

In the Pratt & Whitney Electrolimit Gage the manufacturing industry now has a dependable inspection instrument which does many things previously considered either impractical or impossible. This gage has been proved under actual shop conditions to be capable of making rigid and searching inspections a very simple matter.

This new instrument combines mechanical gaging with electrical magnification to obtain either external or internal measurements. It can be set to any limits desired, ranging from ordinary shop thousandths to millionths. Its operating speed is far greater than other methods. It is almost entirely free from "human element" errors, and is highly efficient even in the hands of an unskilled operator. It is an excellent exploring and analyzing instrument in addition to indicating that a piece is within limits. There is practically nothing to wear out or replace as in other gages. Most important of all in some types of manufacturing, the Electrolimit Gage is the perfect inspection instrument for selective assembly, with its attendant lowering of assembly costs.

PRATT & WHITNEY COMPANY
HARTFORD, CONNECTICUT



International Acetylene Convention Held in Pittsburgh

THE thirty-fifth annual convention of the International Acetylene Association was held in Pittsburgh, Nov. 14 to 16, at the William-Penn Hotel. An instructive program was presented covering developments in oxy-acetylene processes.

In addition to the general session, the program was divided into five sections. The first of these, on Nov. 14, was in charge of W. D. Miller, superintendent of the electrical and mechanical division of the Bethlehem Steel Co., Johnstown, Pa., and dealt with cutting and welding with particular reference to steel mill practice and with hard surfacing.

The session on Nov. 15, in charge of Dean E. A. Holbrook, of the School of Engineering, University of Pittsburgh, had to do with metallurgical aspects of the oxy-acetylene process. A second session on the same day under the chairmanship of Dr. F. N. Speller, National Tube Co., dealt with the subject of pipe welding and testing. A transportation session, held on Nov. 16, covered the subjects of construction of transportation vehicles by welding, as outlined by G. O. Hoglund, supervisor of welding, Aluminum Co. of America, and also included papers on maintenance of railroad rolling stock and other uses of oxy-acetylene in maintenance-of-way work. A fifth session was devoted to the subject of education and safety and included a paper on "Safe Practices on Oxy-Acetylene Welding and Cutting" by E. F. Blank, Jones & Laughlin Steel Co.

Morehead Medal Awarded

John S. Fisher, former Governor of Pennsylvania, and now the president of the Pittsburgh Chamber of Commerce, delivered the address of welcome at the opening session. B. C. Forbes, editor of *Forbes' Magazine*, delivered the keynote address, and H. B. Pearson, president of the association, addressed the assembled members. E. J. Hayden, Linde Air Products Co., Chicago, a past-president of the association, awarded the James Turner Morehead medal to Robert Allen Witherspoon, president and general manager of the Shawinigan Chemicals, Ltd., Montreal, Que. Because of illness, Mr. Witherspoon was unable to attend, and the award was received on his behalf by L. F. Loutrel, of his company. This award is a recognition of distinctive achievement in the acetylene industry.

T. R. Moxley, general master mechanic, Wheeling Steel Corp., presented a paper on the afternoon of Nov. 14 outlining his experience with oxy-acetylene for scrap cutting and furnace tapping. It has been found economical, according to Mr. Moxley,

to install pipe distribution systems in tube mill and open-hearth departments for both oxygen and acetylene. Considerable economy has resulted through a more positive control of pressures and gas consumption. In scrap cutting, cylinder handling is done away with, giving the operators more time for productive work.

Delays in furnace tapping due to exhaustion of oxygen tanks are eliminated in the open-hearth department by means of a welded pipe oxygen line, originating in a central manifold station. This leads to connections between the open-hearth furnaces and not only obviates delays but also possible accidents resulting from oxygen cylinders falling into the pit and coming in contact with molten metal.

"The pipe line," says Mr. Moxley, "is on all counts, a good investment in safety and economy."

A Welded Water Line

Mr. Moxley also described a 12-in. welded water line, 800 ft. long and operating under 1200-lb. hydraulic pressure, which is used for removal of scale in the rolling operations. This line, which is made of 12-in. extra heavy pipe, is oxy-acetylene welded throughout.

The speaker also described the use of a sprayed aluminum coating as a scale preventive for annealing boxes. This coating, which ranges from 0.010 in. in thickness on the sides of the boxes and 0.020-in. thickness on the top, is covered with a layer of potassium silicate which protects the aluminum from furnace temperature and provides opportunity for the aluminum to alloy with the iron.

Cutting Winged-Type Ingots

L. Gerald Firth, president, and L. B. Knox, superintendent of the melting department of the Firth-Sterling Steel Co., McKeesport, Pa., were joint authors of a paper entitled "Oxy-Acetylene Flame Cutting of Winged-Type Billets." It was read by Mr. Firth and described the method used by his company in cutting billets from the three-winged "clover leaf" ingot in which this company casts its metal. The total cost, including labor and material, for cutting these billets by the oxy-acetylene method ranges from \$1.57 to \$1.63 per ton of ingots, according to Mr. Firth.

Dr. George V. Slottman, of Air Reduction Sales Co., New York, presented a paper comparing the cutting efficiency of acetylene and propane. His paper was read by E. V. David, of the Air Reduction Sales Co. E. E. Le Van, of the Haynes Stellite Co., New York, presented a study of "Hard Surfacing in the Steel Mills." Surface temperatures of metal under

frictional contact are unbelievably high, according to his disclosures, two polished steel surfaces at room temperature, for example, pressed together with a force of 100 lb. per sq. in. and moved against each other at the rate of one inch per sec. being heated to about 1200 deg. F. for a depth of 0.0001 in. Although this depth may seem to be negligibly small, actually it contains thousands of layers of molecules. If the metal is one which softens at red heat, it will wear away rapidly, since successive layers of the metal will be quickly exposed to the heating and wearing action. To reduce wear successfully, said the speaker, a material must be hard at those high temperatures at which the maximum wear takes place. Hard-facing alloys, applied to the surfaces taking the brunt of the wear, effect a localization which enables one to utilize the strength and toughness of steel in the body of the part and at the same time to secure the abrasion-resisting qualities of the hard-faced surface.

Welding for Machine Tools Discussed

A DEBATE on the relative merits of welded steel and cast iron for machine tool construction, scheduled for Nov. 19, at the Engineering Societies Building, New York, failed to materialize because the sponsoring committee of the local chapters of the American Welding Society and the American Society of Mechanical Engineers failed to obtain spokesmen for castings.

However, Everett Chapman of Lukenweld, Inc., filled the void with a talk entitled "What's Wrong with Welding and What's Wrong with Cast Iron" with particular reference to their use in machine tool construction. Mr. Chapman used a series of lantern slides, pointed out defects in both methods of fabrication, and was constructively earnest in his recommendations for cooperative activity which would combine the best features of the two types of construction.

M. M. McGrew, Lincoln Electric Co., presented a paper prepared by E. W. P. Smith of the same company, entitled "Design Procedure for Converting Cast Iron to Steel." Primary points covered were deflection and bending moment. A simple beam comparison of cast iron and steel emphasized a resultant saving in weight, yet with the same deflection and bending moment.

J. R. Bausch, Dodge Steel Co., read a paper prepared by R. H. Longbottom on "Steel Castings in Welded Structure," which featured the necessity for cooperation among the designing, engineering and fabricating units of the cast steel and welding industries, in the interest of efficient construction.

SUMMARY OF THIS WEEK'S BUSINESS

Upward Movement in Steel Demand Gains Impetus

**Production Reaches Highest Rate in Second Half—Scrap Advances
On Heavy Mill Purchases—Mill Prices Reaffirmed for Next Quarter**

EXPANSION of iron and steel demand, although still hesitant and irregular, is gathering momentum. Steel ingot output, despite recessions in several producing districts, has risen from 27 to 28½ per cent, the highest rate since June. Steel scrap, as measured by THE IRON AGE composite price, has advanced from \$9.79 to \$10.33 a ton, registering its fifth consecutive weekly increase. At the same time reaffirmation of present prices of pig iron and finished steel for first quarter has had a salutary effect by removing uncertainty from the minds of buyers who were disposed to wait out the market. This clarification of the atmosphere is counted on to accelerate the upward trend in iron and steel bookings which, to date, has been slow but increasingly consistent.

At Chicago steel specifications have risen to the highest level in 21 weeks, with the farm equipment builders contributing a large part of the gain. Most producing centers, Chicago included, have received more support from the automobile industry, though the improvement in demand from that source is still gradual, in keeping with the deliberate moves of the leading motor car makers in preparing for their new model programs.

BUSINESS in heavy iron and steel products is still measured largely by Government expenditures. Cast iron pipe makers have been operating at a good rate on PWA work since September. Structural steel work continues to fluctuate with the placing of large individual tonnages. Fabricated steel awards for the week, at 6400 tons, are only half the total reported a week ago. Bids on 21,000 tons of sheet steel piling for the Grand Coulee dam, Almira, Wash., are now under advisement at Washington.

The Norfolk & Western has purchased 7500 tons of rails from the Carnegie Steel Co. and 2500 tons from the Bethlehem Steel Co. Railroad buying in important volume cannot occur without Government financial aid, which is now under consideration.

THE buoyancy of scrap is due in part to unusually heavy recent purchases by steel producers in various

districts. These orders, believed to aggregate close to 100,000 tons, come with the approach of the year-end inventory period and, under normal conditions, would be regarded as a sure augury of better mill operations. At present, however, the swelling flow of old material to foreign countries casts doubt on the barometric value of the scrap market. Besides draining seaboard sections of scrap, exporters are drawing more and more material from inland points. Chicago, which last week shipped a cargo to Japan, has since moved two vessels to northern Europe.

The filing of first quarter prices on pig iron and finished steel has disclosed no deviations from current quotations. The only important changes affecting the price structure are the discontinuance of quotations on stock tin plate and the final putting into effect of quantity extras on plates and shapes following a postponement of three months.

REPORTS of an impending labor truce in the steel industry are premature. An offer to recognize and deal with union leaders in their official capacity, without, however, agreeing to sign union contracts or deprive non-union employees of their own representation, has been rejected.

Steel ingot output has risen two points to 33 per cent at Chicago, one point to 24 per cent in the Philadelphia district, two points to 32 per cent in the Valleys, five points to 37 per cent in the Cleveland-Lorain area, and 14 points to 55 per cent in the Wheeling district. Operations are off three points to 24 per cent at Buffalo, six points to 47 per cent at Detroit and eight points to 17 per cent in the South.

British steel mills are operating virtually at capacity. Representatives of English machine tool firms are now combing this country for good used machinery to supply a shortage in Great Britain, where demand is brisk. Ford of England is also buying machine tools in the United States.

THE IRON AGE composite prices for finished steel and pig iron are unchanged at 2.124c. a lb. and \$17.90 a ton.

▲ ▲ ▲ A Comparison of Prices ▲ ▲ ▲

Market Prices at Date, and One Week, One Month, and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron

	Nov. 20, 1934	Nov. 13, 1934	Oct. 23, 1934	Nov. 21, 1933
<i>Per Gross Ton:</i>				
No. 2 fdy., Philadelphia	\$20.26	\$20.26	\$20.26	\$18.26
No. 2, Valley furnace	18.50	18.50	18.50	17.50
No. 2 Southern, Cin'ti.	19.13	19.13	19.13	18.13
No. 2, Birmingham†	14.50	14.50	14.50	13.50
No. 2 foundry, Chicago*	18.50	18.50	18.50	17.50
Basic, del'd eastern Pa.	19.76	19.76	19.76	17.76
Basic, Valley furnace	18.00	18.00	18.00	17.00
Valley Bessemer, del'd P'gh	20.76	20.76	20.76	19.76
Malleable, Chicago*	18.50	18.50	18.50	17.50
Malleable, Valley	18.50	18.50	18.50	17.50
L. S. charcoal, Chicago	24.04	24.04	24.04	23.54
Ferromanganese, seab'd car-lots	85.00	85.00	85.00	82.00

†This quotation is for delivery in South; in the North prices are 38c. a ton under delivered quotations from nearest Northern furnace.

*The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Finished Steel

	Nov. 20, 1934	Nov. 13, 1934	Oct. 23, 1934	Nov. 21, 1933
<i>Per Lb.:</i>				
Hot-rolled annealed sheets, No. 24, Pittsburgh	2.40	2.40	2.40	2.25
Hot-rolled annealed sheets, No. 24, Gary	2.50	2.50	2.50	2.35
Sheets, galv., No. 24, P'gh	3.10	3.10	3.10	2.85
Sheets, galv., No. 24, Gary	3.20	3.20	3.20	2.95
Hot-rolled sheets, No. 10, P'gh	1.85	1.85	1.85	1.75
Hot-rolled sheets, No. 10, Gary	1.95	1.95	1.95	1.85
Wire nails, Pittsburgh	2.60	2.60	2.60	2.10
Wire nails, Chicago dist. mill	2.65	2.65	2.65	2.15
Plain wire, Pittsburgh	2.30	2.30	2.30	2.10
Plain wire, Chicago dist. mill	2.35	2.35	2.35	2.15
Barbed wire, galv., P'gh	3.00	3.00	3.00	2.60
Barbed wire, galv., Chicago dist. mill	3.05	3.05	3.05	2.65
Tin plate, 100-lb. box, P'gh	\$5.25	\$5.25	\$5.25	\$4.65

Scrap

<i>Per Gross Ton:</i>				
Heavy melting steel, P'gh	\$11.25	\$10.75	\$10.50	\$11.50
Heavy melting steel, Phila.	10.25	9.63	9.50	9.75
Heavy melting steel, Chicago	9.50	9.00	8.75	8.25
Carwheels, Chicago	10.00	10.00	9.50	9.00
Carwheels, Philadelphia	10.75	10.50	10.25	10.75
No. 1 cast, Pittsburgh	11.50	11.50	11.25	11.25
No. 1 cast, Philadelphia	11.00	11.00	10.75	11.25
No. 1 cast, Ch'go (net ton)	8.50	8.00	8.00	8.50
No. 1 RR. wrot., Philadelphia	11.25	11.25	11.25	11.00
No. 1 RR. wrot., Ch'go (net)	8.75	8.00	7.00	7.25

Rails, Billets, etc.

<i>Per Gross Ton:</i>				
Rails, heavy, at mill	\$36.37 1/2	\$36.37 1/2	\$36.37 1/2	\$36.37 1/2
Light rails, Pittsburgh	35.00	35.00	35.00	32.00
Re-rolling billets, Pittsburgh	27.00	27.00	27.00	26.00
Sheet bars, Pittsburgh	28.00	28.00	28.00	26.00
Slabs, Pittsburgh	27.00	27.00	27.00	26.00
Forging billets, Pittsburgh	32.00	32.00	32.00	31.00
Wire rods, Pittsburgh	38.00	38.00	38.00	35.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.70	1.70	1.70	1.60

Coke, Connellsville

<i>Per Net Ton at Oven:</i>				
Furnace coke, prompt	\$3.85	\$3.85	\$3.85	\$3.75
Foundry coke, prompt	4.60	4.60	4.60	4.25

Finished Steel

<i>Per Lb.:</i>	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.80	1.80	1.80	1.75
Bars, Chicago	1.85	1.85	1.85	1.80
Bars, Cleveland	1.85	1.85	1.85	1.80
Bars, New York	2.13	2.13	2.13	2.08
Plates, Pittsburgh	1.80	1.80	1.80	1.70
Plates, Chicago	1.85	1.85	1.85	1.75
Plates, New York	2.08	2.08	2.08	1.98
Structural shapes, Pittsburgh	1.80	1.80	1.80	1.70
Structural shapes, Chicago	1.85	1.85	1.85	1.75
Structural shapes, New York	2.05 1/4	2.05 1/4	2.05 1/4	1.95 1/4
Cold-finished bars, Pittsburgh	2.10	2.10	2.10	1.95
Hot-rolled strips, Pittsburgh	1.85	1.85	1.85	1.75
Cold-rolled strips, Pittsburgh	2.60	2.60	2.60	2.40

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables. ‡Blue Eagle copper.

Metals

<i>Per Lb. to Large Buyers:</i>	Cents	Cents	Cents	Cents
Electrolytic copper, refinery‡	8.75	8.75	8.75	8.00
Lake copper, New York‡	9.12 1/2	9.12 1/2	9.12 1/2	8.25
Tin (Straits), New York	51.20	51.35	51.25	55.62 1/2
Zinc, East St. Louis	3.72 1/2	3.75	3.85	4.50
Zinc, New York	4.07 1/2	4.10	4.20	4.85
Lead, St. Louis	3.35	3.45	3.55	4.15
Lead, New York	3.50	3.60	3.70	4.30
Antimony (Asiatic), N. Y.	11.87 1/2	10.50	9.50	7.25

▲ ▲ ▲ The Iron Age Composite Prices ▲ ▲ ▲

Finished Steel

Nov. 20, 1934	2.124c. a Lb.
One week ago	2.124c.
One month ago	2.124c.
One year ago	1.995c.

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strips. These products make 85 per cent of the United States output.

	HIGH	LOW
1934	2.199c., April 24	2.008c., Jan. 2
1933	2.015c., Oct. 3	1.867c., April 18
1932	1.977c., Oct. 4	1.926c., Feb. 2
1931	2.037c., Jan. 13	1.945c., Dec. 29
1930	2.273c., Jan. 7	2.018c., Dec. 9
1929	2.317c., April 2	2.273c., Oct. 29
1928	2.286c., Dec. 11	2.217c., July 17
1927	2.402c., Jan. 4	2.212c., Nov. 1

Pig Iron

\$17.90 a Gross Ton
17.90
17.90
16.61

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	HIGH	LOW
1934	17.90, May 1	16.90, Jan. 27
1933	16.90, Dec. 5	13.56, Jan. 3
1932	14.81, Jan. 5	13.56, Dec. 6
1931	15.90, Jan. 6	14.79, Dec. 15
1930	18.21, Jan. 7	15.90, Dec. 16
1929	18.71, May 14	18.21, Dec. 17
1928	18.59, Nov. 27	17.04, July 24
1927	19.71, Jan. 4	17.54, Nov. 1

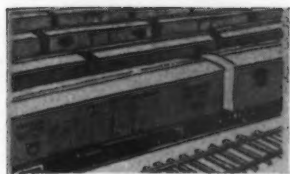
Steel Scrap

\$10.33 a Gross Ton
9.79
9.58
9.83

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	HIGH	LOW
1934	13.00, Mar. 13	9.50, Sept. 25
1933	12.25, Aug. 8	6.75, Jan. 3
1932	8.50, Jan. 12	6.42, July 5
1931	11.33, Jan. 6	8.50, Dec. 29
1930	15.00, Feb. 18	11.25, Dec. 9
1929	17.58, Jan. 29	14.08, Dec. 3
1928	16.50, Dec. 31	13.08, July 2
1927	15.25, Jan. 11	13.08, Nov. 22

Scrap Advances 50c. a Ton In Pittsburgh District



**Consumer Purchases of Old Material
Reflect Growing Confidence of Trade—
Output Up in Valleys and Wheeling Area**

PITTSBURGH, Nov. 20.—Demand for finished steel in the Pittsburgh district is barely showing any improvement. Automotive tonnage has not appeared in major proportions nor has miscellaneous buying displayed any vigorous tendencies in the past week. The only notable increase in bookings is for hot and cold rolled strips, which are moving fairly substantially to automobile centers. Strip output is consequently pointing higher this week. Sheet demand suffered a slump with an attendant decrease in output to about 32 per cent. Tin plate continues to defy earlier predictions of sharp seasonal decline, having jumped to 45 per cent last week, with only a five-point drop in prospect for the current period. In practically all cases Pittsburgh finishing mill schedules are far out in front of raw steel production.

In the Pittsburgh district ingot output is holding for the fifth consecutive week at 18 per cent. In the Wheeling district the addition of a number of sheet mills by one producer has boosted operations for the district 14 points to 55 per cent of capacity. Output in the Valleys and nearby northern Ohio mills is two points higher at 32 per cent.

Unusually heavy scrap purchases in the face of the year-end inventory period are believed to reflect optimism on the part of some steel producers. An important independent mill in the Youngstown district has purchased more than 50,000 tons of scrap for delivery this year. In the Pittsburgh district heavy melting steel has advanced 50c. a ton to \$11 to \$11.50, delivered.

Pig Iron

The present quotations of \$18 for basic and \$19 for Bessemer at Neville Island and Sharpsville are practically certain to be reaffirmed for first quarter delivery. The \$18.50, furnace, base at those points for No. 2 foundry and malleable likewise will probably be unchanged for next quarter. Small-lot buying continues to improve, but the general market is largely depressed by the absence of a major movement of basic and Bessemer grades. Non-integrated steel mills are buying on a hand-to-mouth basis, despite dangerously low stock piles.

No round-lot buying of basic and Bessemer is expected, however, until mill operations swing sharply higher from the present rate. Ingot mold makers are melting very little pig iron.

Semi-Finished Steel

Skelp continues to be in fairly active demand from non-integrated pipe mills. A moderate pickup is noticeable in the movement of billets and slabs. Sheet bar shipments to detached sheet mills are moving more freely, but takings by some tin plate mills continue a seasonal decline. Wire rods are sluggish. It is considered unlikely that any basic changes in current quotations for semi-finished grades will occur for first quarter delivery.

Bolts, Nuts and Rivets

Demand is very quiet, with buying restricted to small spot orders. Although price irregularities have not entirely disappeared, the principal producers are recognizing only the present published discounts. Some mills in this district are engaged on Navy orders, but backlogs are generally meager. With present steel prices expected generally to be reaffirmed for next quarter, the leading bolt, nut and rivet makers do not contemplate any revisions in present discounts for delivery next quarter.

Bars

Daily tonnage is increasing steadily, but still lacks any notable assistance from automotive demand. Alloy bar tonnage, perhaps, is benefiting more directly by automotive buying. Miscellaneous demand, while far from brisk, is tending upward. Few consumers are believed to hold heavy inventories of bars and freer covering is expected to follow the announcement of the first quarter price this week. Important producers are filing for that period on the present Pittsburgh base of 1.80c. a lb.

Reinforcing Steel Bars

The sum of private construction requirements is slightly heavier, but mill schedules in this district are sustained chiefly on a backlog of Government business. No important specifications for public works projects or for private construction were received here in the past week. It is

considered unlikely that any change in the present price of 2.05c., Pittsburgh, for billet steel reinforcing in straight lengths as quoted by distributors will be made for first quarter shipment.

Cold Finished Steel Bars

The increasing interest recently displayed by consumers has not thus far boosted mill bookings proportionately. A further slight improvement in orders is reported, but demand on the whole lacks vigor. Prospects for a lively market continue to hinge largely on automotive buying. Demand from agricultural implement manufacturers is fairly well maintained, while the jobbing trade is exceptionally quiet. Prices remain firm, with little likelihood of any change for first quarter in the present Pittsburgh base of 2.10c. a lb.

Plates and Shapes

A fair amount of barge work pends, but otherwise the plate market is rather drab. No awards against the recent Navy bids have been made. Railroad construction is not at present adding much to plate mill activity. Tank work is entirely featureless. The local structural market last week experienced one of the dullest periods in some time. Fresh inquiries were few in number and disappointing in individual tonnage. It is noteworthy, however, that each week provides a few projects sponsored by private interests. The largest recent award in this district comprised 1200 tons to McClintic-Marshall for a State highway bridge at Leechburg, Pa.

Tubular Products

Output at several detached pipe mills is scheduled slightly higher. Current demand, however, would not appear to justify increased producing schedules, since seasonal decline is reported in standard pipe and oil country goods. On the other hand, with improved price conditions in the oil industry and with the possibility for a greater flow of funds into home building and rehabilitation from normal banking quarters, the outlook for those classes of pipe is considered encouraging. The better feeling in financial circles may also release more generous funds for line pipe projects, which in the past year have been adding little to tube mill order books. Mechanical tubing is relatively quiet, though automotive demand is improving. Locomotive boiler tubes and seamless commercial boiler tubes are moving only in occasional carlots. The important pipe producers will probably reaffirm present discounts for first quarter.

Wire Products

Manufacturers' wire is in slightly heavier demand from automotive centers. Practically all other grades, however, are exceedingly quiet. The scant proportions of recent tonnage have not enabled wire mills to increase

weekly schedules, which generally average not better than 20 to 25 per cent. Filings of first quarter prices by the important producers this week are not expected to reflect any changes in the present base quotations at Pittsburgh.

Sheets

Aggregate demand in the past week fell slightly below that of the preceding week. Incoming tonnage is still well diversified, with automotive tonnage failing to predominate. While some small independent mills are sustaining recent production, scaling down of operations at larger units will this week probably force the average for the sheet industry down to about 32 per cent. The recent sizable purchase of cold-rolled and single pickled black sheets for delivery in Russia was made at a price sharply lower than that applying to this grade for domestic delivery. All grades of sheets will probably be reaffirmed for first quarter delivery at present base prices at Pittsburgh. No early changes are expected in sheet extras.

Tin Plate

Owing to a substantial influx of specifications about the middle of last week, tin plate production reached 45 per cent, ten points higher than the estimated schedule for that week. In the current week output will probably drop five points to 40 per cent of capacity. A good deal of present rolling activity is for export and for general line can manufacture. Undoubtedly a share of present production is being stocked. It is almost certain that the present price of \$5.25 base per box, Pittsburgh, for standard coke tin plate will be reaffirmed for the nine-month period in 1935. Effective Jan. 1, quotations on stock tin plate will be discontinued.

Strip Steel

Continued improvement is reported in demand from motor car and parts makers. Miscellaneous business is increasing on a more moderate scale. Strip mill schedules gradually have been gaining headway and this week may average around 30 per cent of capacity, or better. As previously reported, the present base prices of 1.85c. on hot-rolled strips, and 2.60c. on cold-rolled strips, Pittsburgh, will generally be reaffirmed for first quarter delivery.

Rails and Track Accessories

The price for standard-section steel rails for delivery in first quarter will remain unchanged at \$36.37½ per gross ton, f.o.b. mill. Track spikes and tie plates also are being reaffirmed at the present base schedules. Although the first quarter price for track bolts will not be established before Dec. 1, it is generally conceded that this quotation will reflect no change. The Norfolk & Western Railroad has purchased 7500 tons of 131-lb. steel rails from the Carnegie Steel

Co., and 2500 tons from the Bethlehem Steel Co. The local rail mill will probably complete rolling against the order this week. No important rail or track accessory tonnage pends in this district.

Coke and Coal

Demand for heating coke has been fluctuating with changeable weather. Aggregate movement of domestic coke thus far this season has been slightly below expectations. Foundries are more frequently in the market for small lots of foundry coke. Demand for furnace coke is virtually non-existent. In the bituminous coal market, demand shows little trend. Screened sizes for domestic purposes are naturally moving in seasonal proportions to retail yards. Final movement of slack for Lake delivery has reduced measurably the heavy slack accumulations that previously had presented a serious problem. The last slack shipments out of this district for Lake movement left on Nov. 17, the final date on which coal could be dispatched in order to meet the navigation deadline for the season.

Scrap

A leading independent steel producer in the Youngstown district has been covering heavily on scrap for some time, the accumulated purchases having exceeded 50,000 tons for delivery at Youngstown, Canton and Massillon. For No. 1 heavy melting steel \$10.50, delivered, was paid early in the negotiations and later the

price was advanced to \$11. The purchases included No. 2 steel at \$9.75 to \$10.25, and No. 1 and No. 2 hydraulic bundles. Although the activity at Youngstown has not directly influenced the Pittsburgh district scrap market, trading in the latter area has been brisk in the past 10 days. Approximately 5000 tons of No. 1 heavy melting steel was purchased last week by a district mill at \$11.25. A small independent mill bought a limited quantity of selected heavy melting steel at around \$12. A dealer is offering \$11 for ordinary No. 1 steel, and \$10 for standard No. 2 steel. Railroad material is commanding a premium of at least 50c. a ton. Based on recent transactions and strong sentiment, No. 1 heavy melting steel has advanced 50c. a ton to \$11 to \$11.50, delivered. Corresponding rises have been made in other steel-making grades. It is interesting to note that the recent advance in the Pittsburgh scrap market has been scored without any definite improvement in steel operations. At the low rate of steel operations for the past three or four months, mills had not been faced with the necessity of covering scrap requirements far in advance. In the meantime, however, heavy withdrawals of scrap for export from seaboard points, increasing absorption of Western supplies by Central Western and Central Northern mills, and the high cost of Southern scrap for delivery in this district have combined to create a strong local market.

Finished Steel Orders Increase Steadily In Valleys—Heavy Melting Scrap Up

YOUNGSTOWN, Nov. 20.—Finished steel orders received by Valley producers have increased steadily since the beginning of the month. At the half-way mark in November, bookings reflected an increase of about 35 per cent over those in the first half of October. The most encouraging feature of this improvement is the diversified character of incoming business. Although flat-rolled steel orders from automobile makers have expanded, miscellaneous business has thus far in November virtually kept pace with automotive tonnage, and a further pick-up is practically assured when heavier assemblies of 1935 automobiles begin.

Current production probably does not reflect the full extent of the improvement in the Valley steel market. Finishing mill schedules have advanced encouragingly, but ingot output has pushed higher very gradually. Open-hearth activity now appears to be tending upward, however, and additional furnaces will be fired this week. Including fairly well engaged Bessemer capacity, over-all operations may reach 35 per cent of capacity.

Most producers had piled rather substantial stocks of semi-finished steel during the extremely dull summer months, and finishing mill requirements have been partly satisfied from such stocks. In highly integrated operations here, however, raw steel output will increase practically in step with increased finishing mill activity.

The pig iron market is more active. The merchant trade, however, is still limiting purchases almost entirely to carlot orders for quick shipment. This class of buying will probably rule until the present contractual provisions governing maximum price for the usual quarterly delivery period are changed. Valley pig iron makers do not expect any changes to be made in base furnace quotations for first quarter. The scrap market is also livelier, with No. 1 heavy melting steel quotably higher at \$11 to \$11.50, delivered Youngstown.

Valley fabricators of steel products are enjoying better business. A fabricator of steel office equipment and furniture is engaged at about 75 per cent.

Chicago Rate Up Two Points To 33 Per Cent of Capacity



**Farm Equipment Makers Account for
Large Part of the Gain in Tonnage—
Scrap Prices Up 50c. to 75c. a Ton**

CHICAGO, Nov. 20.—Iron and steel business continues to creep forward and all indications, as seen by sellers, point to further betterment as the month advances. Scrap prices are up 50c. to 75c. a ton with the support of steel mill buying which has been absent for many weeks. Scrap consumption is rising and known supplies of the standard grades are none too plentiful, though higher prices will no doubt draw out tonnages that would otherwise remain in hiding. Current price schedules for pig iron and finished steel are expected to be extended to the first quarter.

Both specifications and new sales of finished steel are the best of the current fall movement. In fact, sales are the best in over 13 weeks and specifications have not been exceeded in 21 weeks. Ingot output has gained two points to 33 per cent of capacity and specifications assure a higher rate before the end of the week, which will in all probability be retained, if not actually exceeded, at the start of next week. Once again farm implement manufacturers stand out prominently in the gain of tonnage to mills, and added support is coming from automobile plants which are expected to increase their releases throughout the remainder of November.

The week has been a very lean one both in awards and new inquiries for fabricated steel. Such private business as is before the trade is light and very little is in prospect.

Government help in the matter of rail purchases may stimulate the market, though most deliveries will not be wanted before spring.

Pig Iron

There is considerable interest in contracting for the first quarter, and sellers believe that books at the opening of the new year will be far heavier than at the start of the fourth period. Specifications are moderately heavier and prices are stable.

Cast Iron Pipe

Awards are light and few new inquiries are making their appearance. Notwithstanding this there remains a considerable pending tonnage, most of which was to have been purchased

with PWA funds that have not been forthcoming because of so many applications having been found faulty. Chicago has ordered 320 tons and will buy an additional 100 tons. No indications are given of an immediate change in pricing policies.

Reinforcing Bars

There exists what might be termed a rush for small tonnages of the order of one to five tons each. Much of this is private in character and it is serving to bolster sentiment in the trade, which now discovers that shipments are holding at a time it had expected them to drop. Low bidders have been announced on the 18,000-ton Fort Peck, Mont., job and the 4000-ton filter plant at Milwaukee. Other water works developments near Chicago call for about 1500 tons.

Rails

Once again this market has quieted down and there is no material change in the background so far as the railroads are concerned. However, word is being passed along among sellers that the Federal Government is eyeing the railroad purchase situation and that it is not improbable that the Government will take a strong hand in giving financial backing to the railroads. There is no hint of Government ownership in this move, but rather some plan that will be similar to the one adopted about a year ago.

Wire Products

Moderate but steady expansion in demand is making itself felt all along the line, and output has gained to the point where it is firmly entrenched at 30 per cent of capacity. Manufacturers who use wire and wire products are taking a more lively interest in the market, and jobbers, though faced with inventory taxes, find that stocks are broken and that they must buy from mills to meet customers' needs, which remain spotty but on a generally higher plane. Wire mills are not yet experiencing a real impetus from automobile plants but they point out that demand for their products usually lags in a rising automobile market. Their expectations are that demand from that direction will improve materially in the next month to six weeks. New prices were filed

today and so far as can be learned all present quotations are being carried forward to the first quarter.

Plates

Day-to-day orders remain light and are confined to a few small tank projects and such plates as are needed by structural fabricators. However, plate mills are looking hopefully to dam work which is near the breaking point. Some railroad business continues to reach the market. The Santa Fe has ordered a 3600-hp. Diesel locomotive and the Northern Pacific is inquiring for 24 light-weight de luxe coaches. All major repair programs recently undertaken by Western railroads have been completed, at least so far as shipments of steel are concerned.

Bars

Miscellaneous demand is holding, and farm implement manufacturers and automobile builders are working demand to still higher levels. New purchases are still cautious as to tonnages, though farm implement manufacturers are showing considerably less restraint than other consuming industries. Automobile plants, though ordering much of current steel needs for delivery to the Detroit area, are placing more than the usual proportion for fabrication in and around Chicago. Tractor plants still enjoy good schedules, and increasing quantities of steel are being used by toy manufacturers and builders of playground equipment.

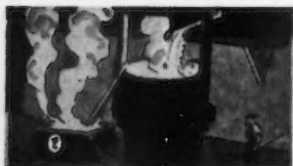
Structural Material

This is probably the slowest week of the depression period in awards, and fresh inquiries are far from reassuring. However, old inquiries are attractive, though they represent the expenditure of Government funds in almost all cases. Bids on the Muscatine, Iowa, dam, which were to have been taken early next week, have been postponed until Dec. 4. Railroad bridge work is confined to repairs that usually run from a few tons to a maximum of 15 tons each. The low bidder has been announced on the Des Moines, Iowa, post office, which will take 650 tons.

Scrap

A mill has reached into the market for about 7500 tons of heavy melting steel and paid \$9.75 a gross ton, delivered. This is an advance of 75c. above the last consumer purchase. That there is still strength in the market is shown by railroad lists, which in the week have brought as high as \$10.30 a gross ton, delivered, for this grade. Sales of other grades also are establishing new high prices. Releases to most consumers are in better volume, and two boats have moved from Chicago docks for points in northern Europe. The Santa Fe is offering 3000 tons, including 1000 tons of heavy melting, and the Wabash and the Burlington each have lists of about 4000 tons.

Philadelphia Trade Hopeful As Operations Improve



Scrap Spurts Upward on Foreign and Domestic Buying—Additional Navy Requirements Out—Sheet Purchases Expected

PHILADELPHIA, Nov. 20.—The entire steel fraternity in this area is talking better business, but so far little actual tonnage has materialized to support this viewpoint. Therefore the optimism seems tempered with considerable hope and probably is founded on evidence of a concerted effort of Government and business to put their shoulders to the industrial wheel before Congress convenes.

Nothing substantial is coming to mills in this district in the way of inquiries, although several of the smaller concerns seemingly are having less difficulty in disposing of their output. The leading factor is operating on a slightly better schedule, and the district rate is consequently up one point to 24 per cent of potential capacity. At Pencoyd three furnaces are still being staggered, and a small structural mill is operating on full turns. A large mill will be in production early next week. The companies turning out cold-drawn products are currently comparatively busy filling Government financed orders, and some of the larger forging plants report that calls from shipbuilders and machinery makers are in more satisfactory volume.

Naturally, the entire trade is watching with interest the filing of prices which started today. So far no changes have been made for first quarter which, no doubt, is to be desired in view of the antipathy of the industry toward an appearance of instability. As tin plate producers have been forced to discard stock plate prices, it has been the hope of some makers that production plate would be advanced. Despite pressure in this direction no increase has yet come to light. New quantity extras on plates and shapes are to go into effect on Dec. 1.

Pig Iron

Consumers are showing some interest in the price filings which started today, and sellers are hopeful that some of this attention may be translated into better buying in the near future. At present the activity in this commodity is running its usual course, with melters limiting purchases to actual prompt requirements

or to the filling of holes in their stocks.

Bars, Plates and Shapes

Actual awards of structural steel at present are disheartening both in size and volume. One good feature is the growing volume of pending business. If the PWA projects and Navy tonnages are not held up too long or stretched over too long a period the mills throughout this district should see more encouraging backlogs before the end of the year. The Navy has not as yet definitely distributed the tonnages bid on Nov. 2. Additional tenders are being taken Dec. 4 on 2050 tons of plates and 1245 tons of black and galvanized shapes for the cruisers Brooklyn and Honolulu. These ships will be built in the Brooklyn Navy Yard. Bids on 130 additional tons of shapes for these cruisers will be taken Nov. 30, and on Dec. 7 the Navy will take tenders on 417 tons of plates for the heavy cruiser Wichita, to be built at Philadelphia. McClintic - Marshall Corp'n. will furnish 1300 tons for a bridge at Leechburg, Pa. Bids go in Thursday on 450 tons of shapes for Byberry Hospital at Philadelphia, and tenders will soon be asked for 1300 tons for a parcel post building at Richmond, Va., and 8000 tons for the Library of Congress addition at Washington.

Sheets

Several of the large fabricators in this district are placing day-to-day orders aggregating around 500 tons weekly. Every indication points toward sizable purchases some time next month when automobile body work swings into full production. However this surge in activity will probably not be comparatively as great as in previous years if the automobile makers carry out some of their plans for spreading out the release of new models. The Heintz plant is turning out some stainless products for the Navy and is well into a Willys-Overland program in addition to its manifold other activities. The Budd plant is turning out some 5000 auto body units a week and will be purchasing about 700 tons of sheets in the first quarter to cover its New Jersey auto license tag contract. The Budd plant is cleaning

up steel stocks from the past season's run and is buying light requirements day to day. The same concern is also now figuring on four streamlined trains, but no definite action is expected on this work for some time. The Navy will open bids on Dec. 4 on about 240 tons of sheets for cruiser construction.

Imports

The following iron and steel imports were received here last week: 661 tons of pig iron from British India; 20 tons of steel wire, 12 tons of steel bars, 6 tons of steel forgings and 3 tons of steel tubes from Sweden; 31 tons of structural shapes and 12 tons of steel bars from Belgium, and 1 ton of steel wire from England.

Scrap

Everyone is talking higher prices and actual advances have been made on important grades. There is some basis for better feeling, but the general price structure seems to be rising too fast in view of the difficulty of steel mills in this territory in maintaining their ingot output at 24 per cent. Although even higher prices may be established before the year's end it is possible that a temporary reaction may take place at a nearer date. The principal broker here has lifted export purchases of heavy melting steel 50c. a ton and is now paying \$9.75 and \$8.75 at Port Richmond for No. 1 and No. 2 respectively. Also a good tonnage of No. 1 was sold last week to a district mill at \$10.50, consequently this grade is now quoted at \$10 to \$10.50. Bethlehem has made a direct purchase of 500 tons of No. 1 for Bethlehem at \$9.50, and is still picking up a little mixed steel at Baltimore.

Large Scrap Sale At Buffalo

BUFFALO, Nov. 20.—The feature of the local scrap market is the sale by Buffalo dealers to district mills of approximately 10,000 tons of No. 2 heavy melting steel and allied grades. The reported price for the No. 2 is \$8.75. The market is stiffening and it is stated that dealers participating in the order must pay close to this mark to cover for their requirements.

Bethlehem's Lackawanna plant is operating five open-hearths and Republic Steel Corp'n., three. Wickwire-Spencer Corp'n. continues to operate one. The Seneca sheet division of Bethlehem is running at about 15 per cent.

Pig iron producers are looking forward to better demand Dec. 1, when first quarter orders may be taken. Bethlehem has still two furnaces in operation, but one of these will be out by Friday of this week.

Output Up Five Points to 37 Per Cent at Cleveland



Increase Is Due to Heavier Demand from Motor Car Industry — Pig Iron Prices Reaffirmed for First Quarter

CLEVELAND, Nov. 20.—The recent increase in the demand for finished steel is being maintained, but there was little further improvement the past week. Some fair-sized lots of sheets continue to come from the motor car industry, although some of the looked-for tonnages from this source have not yet materialized owing to delays in bringing out new models. New orders were placed during the week by the Ford and Chevrolet companies, which are showing more activity at present than other car manufacturers. Business has improved from automobile parts makers in this territory, who are securing releases for parts for new models and will shortly be under production.

Ingot output in the Cleveland-Lorain territory increased this week to 37 per cent of capacity, a five-point gain being due to the addition of two open-hearth furnaces by the Otis Steel Co. This increase is due directly to new orders from motor car manufacturers. Activity in industries outside of the automobile field is still quite limited.

The Chesapeake & Ohio has an inquiry out for 3500 tons of car repair parts. Miscellaneous orders from railroads are for very small lots.

Steel prices for the coming quarter are being filed. No changes are looked for. Orders for good-sized lots are expected from the motor car industry early in December for January shipment.

Pig Iron

Producers today filed schedules reaffirming the present \$18.50 Lake furnace price on No. 2 foundry iron for the first quarter and reestablishing present prices on other grades. Sales are still ahead of October, although the demand from the motor car foundries has not increased as fast as was expected. Demand is holding up well from makers of heating equipment, whose business is stimulated by the Federal housing program.

Sheets

There has been a moderate increase in business from some of the motor car manufacturers, who are following a conservative policy and are not ordering large lots. Demand from

this source, however, has not increased as rapidly as some had expected, this being attributed to the delay of the Chevrolet Motor Co. in getting under production on new models.

Strip Steel

While some new business came from the automotive industry during the week, the aggregate volume was rather light. No new releases were received from parts units of automobile companies that placed orders early in the month. Miscellaneous demand is slow.

Iron Ore

The ore shipping season has closed at all ports except at Escanaba and Marquette, from which two or three cargoes are to be moved this week. Shipments this month up to date aggregate 436,000 tons, making a total for the season of 22,201,409 tons, which will be increased slightly by the cargoes that are still to be shipped. Ore consumption in October was 1,306,477 tons, a gain of 70,085 tons over September, and com-

paring with 1,897,589 tons during October last year. Furnace stocks Nov. 1 were 31,056,191 tons. The shipping season will close with practically the same amount of ore on hand at furnaces and docks as at the close of the season last year. Furnace and dock stocks Nov. 1 amounted to 36,341,007 tons, as against 36,345,473 tons on the same date a year ago. Central district furnaces in October consumed 693,200 tons, an increase of 35,392 tons, and Lake front furnaces used 608,234 tons, a gain of 35,358 tons. Eastern furnaces melted 373 tons, a loss of 123 tons, and all-rail furnaces used 4670 tons, a loss of 542 tons. There were 62 furnaces using Lake ore blast Oct. 31, a gain of six for the month.

Bars, Plates and Shapes

Demand for steel bars shows a slight upward tendency, which is almost wholly due to orders from manufacturers of automobile parts, including forge shops, which are getting under production on forgings for new models. There is an increase of new inquiry in the construction field. The general contract has been awarded for the Lorain Road bridge, requiring 3050 tons of structural shapes.

Scrap

Some heavy melting steel scrap is being sold in Cleveland for shipment against orders for the large tonnage recently placed by a Youngstown district consumer. Dealers are paying \$10.50 for No. 1 heavy melting steel and \$9.75 for No. 2, delivered to Valley points. Locally, sentiment is somewhat better, although Cleveland steel plants and blast furnaces are not expected to buy any scrap for delivery during the remainder of the year. Quotations are unchanged.

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Steel Demand Still Lags in New York



Quantity Extras on Plates and Shapes to Go Into Effect — Prices on Stock Tin Plate to Be Abandoned — Most Prices Being Reaffirmed

NEW YORK, Nov. 20.—Day-to-day bookings of finished steel show little, if any, improvement, and there have been no new developments so far as large pending construction projects are concerned.

Prices for the first quarter are being filed, beginning today, but so far as can be learned involve few changes. It is reported that separate quotations on stock tin plate will be abandoned. Heretofore the overrun in tin plate production has been sold as stock plate to jobbers. The price of stock plate has been lower than on standard plate and the overrun for distribution to the warehouse trade has sometimes been very heavy. Distributors thus have been enabled to compete in some cases for business that normally goes to the mills. A similar situation has arisen in connection with galvanized sheet seconds. A discount for seconds is justified to permit the mills to dispose of material that is not fully up to specifications. But when the output of seconds increases materially the only conclusion that can be drawn is that mill efficiency has taken a sudden drop or that inspection has been made more rigid in the interests of buyers.

Perhaps the most important development affecting steel buyers is the reported adoption of new quantity extras on plates and shapes to be applied Dec. 1 on shipments beginning Jan. 1.

James Stewart & Co., Inc., is low general contract bidder on the alternate selected for the new local Federal building, requiring upward of 28,000 tons of steel.

Railroads are showing increasing interest in light-weight freight equipment and one large Eastern line is seriously considering purchasing cars of the new type to replace older rolling stock in need of heavy repairs.

The Texas Co. has awarded repairs on a tanker, requiring 600 tons of plates, to the Sun Shipbuilding & Dry Dock Co. The City of New York has taken bids on a 72-in. pipe line for the upper West Side, calling for 450 tons of plates.

Pig Iron

Several railroads are inquiring for routine carlots, but the market as a whole continues to be characterized by

hand-to-mouth purchases of small lots. As foundries are melting at only about 30 per cent of capacity with no significant business in prospect, it is to be expected that iron sales will continue at a low figure for some time to come. When first quarter books are opened on Dec. 1 a little forward tonnage will probably be drawn in. However furnace representatives look for no rush to place orders. In the last seven-day period local sellers booked orders aggregating 750 tons, as compared with 1000 tons last week and 1200 tons sold two weeks earlier.

Reinforcing Steel

Mesh sellers are taking a fair quantity of small orders, but demand for bars continues to be somewhat discouraging. The American Steel & Wire Co. will furnish 150 tons and 100 tons for highway projects in Columbia County, N. Y., and at Bristol, Conn.,

Steel Output Off In South

BIRMINGHAM, Nov. 20.—Current pig iron sales are mostly for spot deliveries and in small lots. A few foundries are still well stocked, but a majority are buying iron as needed and for immediate consumption. With business dragging and pig iron prices stationary, foundries do not care to again load up with stocks, as they did in the second quarter. The base price is \$14.50.

Five blast furnaces will operate this week, an increase of one over the past several months. The increase, however, is only for this week. The Tennessee company is operating two at Fairfield, instead of one, due to the fact that the charge in its banked furnace, No. 6, slipped and is to be worked out this week. The furnace will again be banked at the end of the week.

Steel tonnage in the last two months has varied little from week to week. Sheets and wire products are the most active lines, but have by no means attained the volume ex-

pectively. There is approximately 600 tons of mesh business still pending in New York State and a few hundred tons in Pennsylvania. However, other states in this area are currently almost inactive. No bar business of any size has been placed in the last week. Jobs which are still active include about 1000 tons for the Federal Office Building at New York, 125 tons for a sewage treatment plant at Hartford, Conn., and 300 tons for several New York State road jobs.

Scrap

With domestic buying developing in the Pittsburgh and Philadelphia areas this export market is talking higher prices, and every indication is that advances of 50c. a ton on heavy melting steels will be made within the week. Brokers are still securing some truck lots of No. 1 and No. 2 alongside barges at \$8 and \$6.50 a ton respectively, and some of the smaller dealers are paying more than \$4 for unprepared yard and iron steel. However the general market on this latter grade seems to be still between \$3.50 and \$4. The City of New York disposed of 1100 tons of girder rails last week at \$7.61 on the ground. As these will go for export the price averages out close to \$8.75 a ton alongside the boat. At present two boats are loading steel for Japan and a boatload of cast iron and stove plate has been accumulated for English melters. In Brooklyn a less active broker is starting to load two lighters with steel for foreign delivery.

pected. Demand for heavier products is spasmodic.

Only four open-hearths will be worked this week, these being at the Fairfield works of the Tennessee company. Gulf States Steel Co. closed down its two active open-hearths on Saturday so as to work off an accumulation of ingots in stock. The shutdown is for a week at least and may continue until the end of the month. There will be no change in the mill operations of the company.

For the third month, the pressure pipe outlook has been much better and there are indications that December will also be favorable. November shipments and bookings have been just as large as in October. The real results of the PWA program are now being felt and the volume of business from that source has been rather steady. Lettings have been rather numerous, although many of them have been for small quantities, from 100 to 200 tons. During the present week Pensacola will open bids on 1600 tons; Clinton, S. C., on 500 tons; Houston, Tex., on 200 tons; and Monterey, Tenn., on 200 tons.

Prices of Finished Steel and Iron Products

BARS, PLATES, SHAPES

Iron and Steel Bars

Soft Steel	Base per Lb.
F.o.b. Pittsburgh	1.80c.
F.o.b. Chicago	1.85c.
F.o.b. Gary	1.85c.
F.o.b. Duluth	1.95c.
Del'd Detroit	1.95c.
F.o.b. Cleveland	1.85c.
F.o.b. Buffalo	1.90c.
Del'd Philadelphia	2.00c.
Del'd New York	2.13c.
F.o.b. Birmingham	1.95c.
F.o.b. cars dock Gulf ports	2.20c.
F.o.b. cars dock Pacific ports	2.35c.

Rail Steel

(For merchant trade)

F.o.b. Pittsburgh	1.70c.
F.o.b. Chicago	1.75c.
F.o.b. Gary	1.75c.
F.o.b. Moline, Ill.	1.75c.
F.o.b. Cleveland	1.75c.
F.o.b. Buffalo	1.80c.
F.o.b. Birmingham	1.85c.
F.o.b. cars dock Gulf ports	2.10c.
F.o.b. cars dock Pacific ports	2.25c.

Billet Steel Reinforcing

(Straight lengths as quoted by distributors)	
F.o.b. Pittsburgh	2.05c.
F.o.b. Chicago	2.10c.
F.o.b. Gary	2.10c.
Del'd Detroit	2.20c.
F.o.b. Cleveland	2.10c.
F.o.b. Youngstown	2.10c.
F.o.b. Buffalo	2.10c.
F.o.b. Birmingham	2.10c.
F.o.b. cars dock Gulf ports	2.45c.
F.o.b. cars dock Pacific ports	2.45c.

Rail Steel Reinforcing

(Straight lengths as quoted by distributors)	
F.o.b. Pittsburgh	1.90c.
F.o.b. Chicago	1.95c.
F.o.b. Gary	1.95c.
F.o.b. Cleveland	1.95c.
F.o.b. Youngstown	1.95c.
F.o.b. Buffalo	1.95c.
F.o.b. Birmingham	1.95c.
F.o.b. cars dock Gulf ports	2.30c.
F.o.b. cars dock Pacific ports	2.30c.

Iron

F.o.b. Chicago	1.80c.
F.o.b. Terre Haute, Ind.	1.75c.
F.o.b. Louisville, Ky.	2.10c.
F.o.b. Danville, Pa.	1.80c.
F.o.b. Berwick, Pa.	1.80c.

Cold Finished Bars and Shafting*

	Base per Lb
F.o.b. Pittsburgh	2.10c
F.o.b. Chicago	2.15c
F.o.b. Gary	2.15c
F.o.b. Cleveland	2.15c
F.o.b. Buffalo	2.20c
Del'd Detroit	2.30c
Del'd eastern Michigan	2.35c

* In quantities of 10,000 to 19,000 lb.

Fence and Sign Posts

Angle Line Posts	Base per Net Ton
F.o.b. Pittsburgh	\$50.00
F.o.b. Chicago	50.00
F.o.b. Duluth	51.00
F.o.b. Cleveland	50.90
F.o.b. Birmingham	53.00
F.o.b. Houston	59.00
F.o.b. cars dock Pacific ports	68.00

Plates

	Base per Lb.
F.o.b. Pittsburgh	1.80c.
F.o.b. Chicago	1.85c.
F.o.b. Gary	1.85c.
Del'd Cleveland	1.95c.
F.o.b. Coatesville	1.90c.
F.o.b. Sparrows Point	1.90c.
Del'd Philadelphia	1.95c.
Del'd New York	2.08c.
F.o.b. Birmingham	1.95c.
F.o.b. cars dock Gulf ports	2.20c.
F.o.b. cars dock Pacific ports	2.35c.
Wrought iron plates, f.o.b. P'gh	3.20c.

Floor Plates

F.o.b. Pittsburgh	3.35c.
F.o.b. Chicago	3.40c.
F.o.b. Coatesville	3.45c.
F.o.b. cars dock Gulf ports	3.75c.
F.o.b. cars dock Pacific ports	3.90c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh	1.80c.
F.o.b. Chicago	1.85c.
Del'd Cleveland	1.935c.
F.o.b. Buffalo	1.90c.
F.o.b. Bethlehem	1.90c.
Del'd Philadelphia	2.065c.
Del'd New York	2.0525c.
F.o.b. Birmingham (standard)	1.95c.
F.o.b. cars dock Gulf ports	2.25c.
F.o.b. cars dock Pacific ports	2.35c.

Steel Sheet Piling

	Base per Lb.
F.o.b. Pittsburgh	2.15c.
F.o.b. Chicago	2.25c.
F.o.b. Buffalo	2.25c.
F.o.b. cars dock Gulf ports	2.60c.
F.o.b. cars dock Pacific ports.....	2.60c.

SHEETS, STRIP, TIN PLATE

TERNE PLATE

Sheets

Hot Rolled	Base per Lb.
No. 10, f.o.b. Pittsburgh	2.15c.
No. 10, f.o.b. Gary	1.95c.
No. 10, del'd Detroit	2.05c.
No. 10, del'd Phila.	2.14c.
No. 10, f.o.b. Birmingham	2.00c.
No. 10, f.o.b. dock cars Pacific ports	2.40c.

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh	2.40c.
No. 24, f.o.b. Gary	2.50c.
No. 24, del'd Detroit	2.60c.
No. 24, del'd Phila.	2.69c.
No. 24, f.o.b. Birmingham	2.55c.
No. 24, f.o.b. dock cars Pacific ports	3.05c.
No. 24, wrought iron, Pittsburgh	4.50c.

Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh	2.50c.
No. 10 gage, f.o.b. Gary	2.60c.
No. 10 gage, del'd Detroit	2.70c.
No. 10 gage, del'd Phila.	2.79c.
No. 10 gage, f.o.b. Birmingham	2.55c.
No. 10 gage, f.o.b. dock cars Pacific ports	3.10c.

Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh	2.95c.
No. 20 gage, f.o.b. Gary	3.05c.
No. 20 gage, del'd Detroit	3.15c.
No. 20 gage, del'd Phila.	3.24c.
No. 20 gage, f.o.b. Birmingham	3.10c.
No. 20 gage, f.o.b. dock cars Pacific ports	3.50c.

Galvanized Sheets

No. 24, f.o.b. Pittsburgh	3.10c.
No. 24, f.o.b. Gary	3.20c.
No. 24, del'd Phila.	3.29c.
No. 24, f.o.b. Birmingham	3.25c.
No. 24, f.o.b. dock cars Pacific ports	3.70c.
No. 24, wrought iron, Pittsburgh	4.95c.

Long Ternes

No. 24, unassorted 8-lb. coating	3.40c.
f.o.b. Pittsburgh	3.40c.
F.o.b. cars dock Pacific ports	4.10c.

Vitreous Enameling Stock

No. 20, f.o.b. Pittsburgh	3.10c.
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Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.75c.
No. 28, Gary	2.85c.
No. 28, cars dock, Pacific Coast	3.35c.

Tin Plate Base per Box

Standard cokes, f.o.b. P'gh district mill	\$5.25
Standard cokes, f.o.b. Gary	5.35
Standard cokes, f.o.b. cars dock Pacific ports	5.90

Terne Plate

(F.o.b. Pittsburgh)

8-lb. coating I.C.	\$10.00
15-lb. coating I.C.	12.00
20-lb. coating I.C.	13.00
25-lb. coating I.C.	14.00
30-lb. coating I.C.	15.25
40-lb. coating I.C.	17.50

Hot-Rolled Hoops, Bands, Strips and Flats under 1/4 In.

Base per Lb.	
All widths up to 24 in., P'gh.....	1.85
All widths up to 24 in., Chicago.....	1.95
All widths up to 24 in., del'd De- troit	2.05
All widths up to 24 in., Birmingham	2.00
Cooperage stock, Pittsburgh.....	2.10
Cooperage stock, Chicago	2.20

Cold-Rolled Strips

	Base per L
F.o.b. Pittsburgh	2.60
F.o.b. Cleveland	2.60
Del'd Chicago	2.88
F.o.b. Worcester	2.80

Fender Stock

No. 14, Pittsburgh or Cleveland	2.90c.
No. 14, Worcester	3.30c.
No. 20, Pittsburgh or Cleveland	3.30c.
No. 20, Worcester	3.70c.

Hot-Rolled Rail Steel Strips

	Base per Lb.
F.o.b. Pittsburgh	1.70
F.o.b. Chicago	1.75
F.o.b. Birmingham	1.85

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland.)

To Manufacturing Trade Per Lb.

Bright wire	2.30c.
Spring wire	2.90c.

Chicago prices on products sold to the manufacturing trade are \$1 a ton above Pittsburgh or Cleveland. Worcester prices are \$2 a ton above, and Pacific Coast prices \$3 a ton above.

To Jobbing Trade

Qualified jobbers are entitled to a reduction of 20c. a 100 lb. from the base price on carload shipments to stock, and of 10c. a 100 lb. on less-carload shipments to stock.

Base per Keg

Standard wire nails	\$2.60
Smooth coated nails	2.60
Galvanized nails	4.60
15 gage and coarser	5.10
16 gage and finer	5.10

Base per 100 Lb.

Annealed fence wire	\$2.45
Galvanized fence wire	2.80
Polished staples	3.30
Galvanized staples	3.35
Barbed wire, galvanized	3.00
Woven wire fence, base column	63.00

Chicago and Anderson, Ind., mill prices are \$1 a ton over Pittsburgh base (on all products except woven wire fence, for which the Chicago price is \$2 above Pittsburgh); Duluth, Minn., and Worcester, Mass., mill prices are \$2 a ton over Pittsburgh (except for woven wire fence at Duluth which is \$3 over Pittsburgh), and Birmingham mill prices are \$3 a ton over Pittsburgh.

On manufacturers' wire prices at Pacific ports are \$5 above the Pittsburgh base. On high-carbon spring wire, prices at Pacific ports are also \$5 above Pittsburgh. On wire nails, barbed wire, staples and fence wire, prices at Houston, Galveston and Corpus Christi are \$6 a ton over Pittsburgh, while New Orleans and Pacific Coast prices are \$8 over Pittsburgh. Exception: on fence wire Pacific Coast prices are \$11 a ton above Pittsburgh.

Wire Hoops, Twisted or Welded

	Off List
F.o.b. Pittsburgh	35 and 2½ off
F.o.b. Chicago	35 off

Bale Ties, Single Loop

	Base per Net Ton
F.o.b. Pittsburgh	\$63.
F.o.b. Chicago	64.
F.o.b. Duluth	65.
F.o.b. Cleveland	63.
F.o.b. Birmingham	66.
F.o.b. cars dock Houston, Galveston, Beaumont, Orange or Corpus Christi, Tex.	72.
F.o.b. cars dock Pacific ports	74.

STEEL AND WROUGHT PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills
F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld

Inches	Steel	Black Galv.	Inches	Wrought Iron	Black Galv.
1/2	51 1/2	29 1/2	1/2	51 1/2	29 1/2
3/4	51 1/2	33	3/4	51 1/2	33
1	51 1/2	37	1	51 1/2	37
1 1/4	51 1/2	47	1 1/4	51 1/2	47
1 1/2	51 1/2	52	1 1/2	51 1/2	52
1 3/4	51 1/2	55	1 3/4	51 1/2	55

Lap Weld

2	60	51	2	37	22 1/2
2 1/2	60	54	2 1/2	37	25
3	60	56	3	37	28 1/2
3 1/2	60	56	3 1/2	37	28 1/2
4	60	56	4	37	28 1/2
4 1/2	60	56	4 1/2	37	28 1/2
5	60	56	5	37	28 1/2
5 1/2	60	56	5 1/2	37	28 1/2
6	60	56	6	37	28 1/2
6 1/2	60	56	6 1/2	37	28 1/2
7	60	56	7	37	28 1/2
7 1/2	60	56	7 1/2	37	28 1/2
8	60	56	8	37	28 1/2
8 1/2	60	56	8 1/2	37	28 1/2
9	60	56	9	37	28 1/2
9 1/2	60	56	9 1/2	37	28 1/2
10	60	56	10	37	28 1/2
10 1/2	60	56	10 1/2	37	28 1/2
11	60	56	11	37	28 1/2
11 1/2	60	56	11 1/2	37	28 1/2
12	60	56	12	37	28 1/2
12 1/2	60	56	12 1/2	37	28 1/2

Butt Weld, extra strong, plain ends

1/2	48 1/2	33 1/2	1/2	13	45 1/2
3/4	48 1/2	38	3/4	13	45 1/2
1	48 1/2	47 1/2	1	13	45 1/2
1 1/4	48 1/2	52	1 1/4	13	45 1/2
1 1/2	48 1/2	55	1 1/2	13	45 1/2

Lap Weld, extra strong, plain ends

2	58	50	2	40	36
2 1/2	58	54	2 1/2	40	36
3	58	54	3	40	36
3 1/2	58	54	3 1/2	40	36
4	58	54	4	40	36
4 1/2	58	54	4 1/2	40	36
5	58	54	5	40	36
5 1/2	58	54	5 1/2	40	36
6	58	54	6	40	36
6 1/2	58	54	6 1/2	40	36
7	58	54	7	40	36
7 1/2	58	54	7 1/2	40	36
8	58	54	8	40	36
8 1/2	58	54	8 1/2	40	36
9	58	54	9	40	36
9 1/2	58	54	9 1/2	40	36
10	58	54	10	40	36
10 1/2	58	54	10 1/2	40	36
11	58	54	11	40	36
11 1/2	58	54	11 1/2	40	36
12	58	54	12	40	36
12 1/2	58	54	12 1/2	40	36

On standard steel pipe an extra 5% off is allowed on sales to consumers while two 5's off apply on sales to jobbers. On less-than-carload shipments prices are determined by adding 20 and 25% and the carload freight rate to the base card. On structural steel pipe the base card is reduced 2 points and two 5's off are allowed to consumers and three 5's off to jobbers.

Note—Chicago district mills have a base

two points less than the above discounts. Chicago delivered base is 2 1/2 points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Seamless Steel Commercial Boiler Tubes and Locomotive Tubes
(Net base prices per 100 ft. f.o.b. Pittsburgh, in carload lots)

		Drawn	Hot Rolled
1 in. o.d.	13 B.W.G.	\$ 8.60	\$7.81
1 1/4 in. o.d.	13 B.W.G.	10.19	9.26
1 1/2 in. o.d.	13 B.W.G.	11.26	10.24
1 3/4 in. o.d.	13 B.W.G.	12.81	11.63
2 in. o.d.	13 B.W.G.	13.25	12.07
2 1/4 in. o.d.	13 B.W.G.	16.00	14.54
2 1/2 in. o.d.	12 B.W.G.	19.29	17.54
3 in. o.d.	12 B.W.G.	20.45	18.56
3 1/4 in. o.d.	12 B.W.G.	21.45	19.50
3 1/2 in. o.d.	12 B.W.G.	22.45	20.50
3 3/4 in. o.d.	11 B.W.G.	27.09	24.61
4 in. o.d.	10 B.W.G.	33.00	30.54
4 1/4 in. o.d.	10 B.W.G.	41.08	37.33
5 in. o.d.	9 B.W.G.	51.56	46.81

BOLTS, NUTS, RIVETS AND SET SCREWS

Bolts and Nuts
(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
Machine bolts 70, 10, 10 and 10	
Carriage bolts 70, 10, 10 and 10	
Lag bolts 70, 10, 10 and 10	
Flow bolts, Nos. 1, 2, 3 and 7	
heads 70, 10, 10 and 10	
Hot-pressed nuts, blank or tapped, square 70, 10, 10 and 10	
Hot-pressed nuts, blank or tapped, hexagons 70, 10, 10 and 10	
C.p.c. and t. square or hex. nuts, blank or tapped 70, 10, 10 and 10	
Semi-finished hexagon nuts, U.S.S. all sizes 70, 10, 10 and 10	
Semi-finished hexagon nuts, S.A.E. 1/4 in. to 7/16 in. diameter 70, 10, 10 and 10	
1/4 in. to 1 in. diameter 70, 10, 10 and 10	
larger than 1 in. diameter 70, 10, 10 and 10	
Store bolts in packages, Pittsburgh 75	
Store bolts in packages, Chicago 75	
Store bolts in packages, Cleveland 75	
Store bolts in bulk, P'gh. 85	
Store bolts in bulk, Chicago 85	
Store bolts in bulk, Cleveland 85	
Tire bolts 60 and 10	

Large Rivets	
(1/2-in. and larger)	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland.....	\$2.90
F.o.b. Chicago	3.00
F.o.b. Birmingham	3.05

Small Rivets	
(7/16-in. and smaller)	Per Cent Off List
F.o.b. Pittsburgh	70 and 5
F.o.b. Cleveland	70 and 5
F.o.b. Chicago and Birm'g'm.....	70 and 5

Cap and Set Screws
(Freight allowed up to but not exceeding 65c. per 100 lb. on lots of 500 lb. or more)

	Per Cent Off List
Milled cap screws, 1 in. dia. and smaller 85	
Milled standard set screws, case hardened, 1 in. dia. and smaller..... 75 and 10	
Milled headless set screws, cut thread 1/2 in. and smaller..... 75 and 10	
Unset hex. head cap screws, U.S.S.S. or S.A.W. thread, 1 in. dia. and smaller 85 and 10	
Unset set screws, cut and oval point..... 80	
Milled studs 65 and 10	

Alloy and Stainless Steel

Alloy Steel Ingots

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem.
Uncropped.....\$40 per gross ton

Alloy Steel Blooms, Billets and Slabs

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem.
Base price, \$49 a gross ton.
Price del'd Detroit is \$52.

Alloy Steel Bars

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.
Open-hearth grade, base.....2.45c.
Delivered price at Detroit is.....2.60c.
S.A.E.

Series	Differential
Numbers	per 100 lb.
2000 (1/2% Nickel)	\$0.25
2100 (2 1/4% Nickel)	0.35
2300 (3 1/2% Nickel)	1.50
2500 (5% Nickel)	2.25
3100 Nickel Chromium	0.55
3200 Nickel Chromium	1.25
3300 Nickel Chromium	3.80
3400 Nickel Chromium	3.20

4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum) 0.50

4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum) 0.70

4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum) (1.50 to 2.00 Nickel) 1.05

5100 Chromium Steel (0.60 to 0.90 Chromium) 0.35

5100 Chromium Steel (0.80 to 1.10 Chromium) 0.45

5100 Chromium Spring Steel..... 1.20

6100 Chromium Vanadium Bar..... 0.95

4100 Chromium Vanadium Spring Steel 1.50

Chromium Nickel Vanadium 0.95

Carbon Vanadium 0.95

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. The differential for cold-drawn bars is 1/4c. per lb. higher with separate extras. Blooms, billets and slabs under 4x4 in. or equivalent are sold on the bar base. Slabs with a section area of 16 in. and 2 1/2 in. thick or over take the billet base. Sections 4x4 in. to 10x10 in. or equivalent carry a gross ton price, which is the net price for bars for the same analysis. Larger sizes carry extras.

Alloy Cold-Finished Bars
F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 2.95c. base per lb.

STAINLESS STEEL No. 302

(17 to 19% Cr. 7 to 9% Ni. 0.08 to 0.20% C)
(Base Prices, F.o.b. Pittsburgh)

	Per Lb.
Bars	23c.
Plated	25c.
Sheets	35c.
Hot-rolled strip	20 1/2c.
Cold-rolled strip	27c.

Raw and Semi-Finished Steel

Carbon Steel Re-rolling Ingots

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham.
Uncropped.....\$29 per gross ton

Carbon Steel Forging Ingots

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham.
Uncropped.....\$31 per gross ton

Billets, Blooms and Slabs

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham.
Per Gross Ton

Re-rolling\$27.00
Forging quality 32.00

Delivered Detroit

Re-rolling\$30.00
Forging 35.00

Billets Only F.o.b. Duluth

Re-rolling\$29.00
Forging 34.00

Sheet Bars

F.o.b. Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.
Per Gross Ton

Open-hearth or Bessemer.....\$28.00

Skelp

F.o.b. Pittsburgh, Chicago, Youngstown, Buffalo, Coatesville, Pa., Sparrows Point, Md.

Grooved 1.70c.
Universal 1.70c.
Sheared 1.70c.

Tube Rounds

Base per Lb.
F.o.b. Pittsburgh 1.80c.
F.o.b. Chicago 1.85c.
F.o.b. Cleveland 1.85c.
F.o.b. Buffalo 1.90c.
F.o.b. Birmingham 1.95c.

Wire Rods

(Common soft, base)
Per Gross Ton

F.o.b. Pittsburgh\$38.00
F.o.b. Cleveland 38.00
F.o.b. Chicago 39.00
F.o.b. Anderson, Ind. 39.00
F.o.b. Youngstown 40.00
F.o.b. Worcester, Mass. 41.00
F.o.b. Birmingham 41.00
F.o.b. San Francisco 47.00

Pig Iron and Ferroalloys

PIG IRON

PRICES PER GROSS TON AT BASING POINTS

Basing Points	No. 2 Fdry.	Malleable	Basic	Bessemer
Everett, Mass.	\$19.50	\$20.00	\$19.00	\$20.50
Bethlehem, Pa.	19.50	20.00	19.00	20.50
Birdsboro, Pa.	19.50	20.00	19.00	20.50
Swedesland, Pa.	19.50	20.00	19.00	20.50
Steelton, Pa.	19.50	20.00	19.00	20.50
Sparrows Point, Md.	19.50	20.00	19.00	20.50
Neville Island, Pa.	18.50	18.50	18.00	19.00
Sharpville, Pa.	18.50	18.50	18.00	19.00
Youngstown 18.50	18.50	18.50	18.00	19.00
Buffalo 18.50	18.50	18.50	18.00	19.00
Erie, Pa. 18.50	18.50	18.50	18.00	19.00
Cleveland 18.50	18.50	18.50	18.00	19.00
Toledo, Ohio 18.50	18.50	18.50	18.00	19.00
Jackson, Ohio 20.25	20.25	19.75	19.75	19.75
Detroit 18.50	18.50	18.00	18.00	19.00
Hamilton, Ohio 18.50	18.50	18.00	18.00	19.00
Chicago 18.50	18.50	18.00	18.00	19.00
Granite City, Ill. 18.50	18.50	18.00	18.00	19.00
Duluth, Minn. 19.00	19.00	18.50	18.50	19.00
Birmingham 14.50	14.50	13.50	13.50	19.00
Provo, Utah 17.50	17.50	.....	.....	.....

DELIVERED PRICES PER GROSS TON AT CONSUMING CENTERS

	No. 2 Fdry.	Malleable	Basic	Bessemer
Boston Switching District	\$20.00	\$20.50	\$19.50	\$21.00
From Everett, Mass.	20.00	20.50	19.50	21.00
Brooklyn	21.77	22.27	21.27	22.77
From East Pa. or Buffalo.....	21.77	22.27	21.27	22.77
Newark or Jersey City, N. J.	20.89	21.39	20.39	21.89
From East Pa. or Buffalo.....	20.89	21.39	20.39	21.89
Philadelphia	20.26	20.76	19.76	21.26
From Eastern Pa.	20.26	20.76	19.76	21.26
Cincinnati	19.51	19.51	19.01	20.01
From Hamilton, Ohio 19.51	19.51	19.51	19.01	20.01
Canton, Ohio	19.76	19.76	19.26	20.26
From Cleveland and Youngstown	19.76	19.76	19.26	20.26
Columbus, Ohio	20.50	20.50	.....	.....
From Hamilton, Ohio..... 20.50	20.50	20.50	.....	.....
Mansfield, Ohio	20.26	20.26	.....	.....
From Cleveland and Toledo.. 20.26	20.26	20.26	.....	.....
Indianapolis	20.77	20.77	.....	.....
From Hamilton, Ohio..... 20.77	20.77	20.77	.....	.....
South Bend, Ind.	20.55	20.55	.....	.....
From Chicago	20.55	20.55	.....	.....
Milwaukee	19.50	19.50	.....	.....
From Chicago	19.50	19.50	.....	.....
St. Paul	20.94	.....	.....	.....
From Duluth	20.94	.....	.....	.....
Davenport, Iowa	20.26	20.26	.....	.....
From Chicago	20.26	20.26	.....	.....
Kansas City	21.04	21.04	.....	.....
From Granite City 21.04	21.04	21.04	.....	.....

Delivered prices on Southern iron for shipment to Northern points are 38c. a gross ton below delivered prices from the nearest Northern basing points.

LOW PHOSPHORUS PIG IRON

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.....\$23.50

Johnson City, Tenn. 23.50
Del'd Chicago 29.15
Johnson City, Tenn. (off grade) 19.50

GRAY FORGE PIG IRON

Valley furnace\$18.00
Pittsburgh district furnace 18.00

CHARCOAL PIG IRON

Lake Superior furnace\$21.00
Delivered Chicago 24.04
Delivered Buffalo 24.28

CANADA

Pig Iron

Per gross ton:	Delivered Toronto
No. 1 fdy., sil. 2.25 to 2.75.....	\$21.00
No. 2 fdy., sil. 1.75 to 2.75.....	20.50
Malleable	21.00

Per gross ton:	Delivered Montreal
No. 1 fdy., sil. 2.25 to 2.75.....	\$22.50
No. 2 fdy., sil. 1.75 to 2.25.....	22.00
Malleable	22.50
Basic	22.50

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.
Per Gross Ton

Domestic, 80% (carload)\$55.00

Spiegeleisen

Per Gross Ton Furnace
Domestic, 19 to 21%\$28.00

Electric Ferrosilicon

Per Gross Ton Delivered
50% (carloads)\$77.50
50% (ton lots) 85.00
75% (carloads) 126.00
75% (ton lots) 136.00
14% to 16% (f.o.b.) Welland, Ont. (in carloads) (duty paid) 31.90
14% to 16% (less carloads) 38.50

Silvery Iron

F.o.b. Jackson, Ohio, Furnace
Per Gross Ton

6%\$22.75
7% 23.75
8% 24.75
9% 25.75
10% 26.75
11% 27.75

12%\$29.25
13% 30.75
14% 32.25
15% 33.75
16% 35.25
17% 36.75

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed.

Bessemer Ferrosilicon

F.o.b. Jackson, Ohio, Furnace
Per Gross Ton

10%\$27.75
11% 28.75
12% 29.75
13% 31.75

14%\$33.25
15% 34.75
16% 36.25
17% 37.75

Manganese 1 1/2 to 3%, \$1 a ton additional. For each unit of manganese over 3%, \$1 a ton additional. Phosphorus 0.15% or over, \$1 ton additional.

Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Other Ferroalloys

Ferrotungsten, per lb. contained W, del., carloads\$1.35 to \$1.60

Ferrotungsten, less carloads. 1.45 to 1.55

Ferrocromium, 4 to 6% carbon and up, 65 to 70% Cr. per lb. contained Cr. delivered, in carloads 10.90c.

Ferrocromium, 2% carbon 16.50c. to 17.00c.

Ferrocromium, 1% carbon 17.50c. to 18.00c.

Ferrocromium, 0.10% carbon 19.50c. to 20.00c.

Ferrocromium, 0.06% carbon 20.00c. to 20.50c.

Ferrovanadium, del., per lb. contained V\$2.70 to \$2.90

Ferrocobaltitum, 15 to 18% Ti, 6 to 8% C, f.o.b. furnace carload and contract per net ton \$137.50

Ferrophosphorus, electric, or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton with \$2 unitage 50.00

Ferrophosphorus, electric, 24% f.o.b. Anniston, Ala., per gross ton with \$2.75 unitage 65.00

Ferromolybdenum, per lb. Mo., del. 95c.

Calcium molybdate, per lb. Mo., del. 80c.

Silico spiegel, per ton, f.o.b. furnace, car lots or less per ton \$38.00

Ton lots or less per ton 45.50

Silico-manganese, gross ton, delivered: 2.50% carbon grade 90.00

2% carbon grade 95.00

1% carbon grade 105.00

Spot prices\$5 a ton higher

Iron and Steel Scrap

PITTSBURGH

Per gross ton delivered consumers' yards:	
No. 1 heavy melting steel	\$11.00 to \$11.50
No. 2 heavy melting steel	10.00 to 10.50
No. 2 railroad wrought	11.00 to 11.50
Scrap rails	11.00 to 11.50
Rails 3 ft. and under	14.00 to 14.50
Compressed sheet steel	11.00 to 11.50
Hand bundled sheet steel	10.00 to 10.50
Hvy. steel axle turnings	9.00 to 9.50
Machine shop turnings	7.00 to 7.50
Short shov. turnings	7.00 to 7.50
Short mixed borings and turnings	5.25 to 5.75
Cast iron borings	5.25 to 5.75
Cast iron carwheels	11.50 to 12.00
Heavy breakable cast	10.00 to 10.50
No. 1 cast	11.25 to 11.75
Railr. knuckles and couplers	14.00 to 14.50
Rail. coil and leaf springs	14.00 to 14.50
Balled steel wheels	14.00 to 14.50
Low phos. billet crops	14.25 to 14.75
Low phos. sheet bar crops	14.25 to 14.75
Low phos. plate scrap	13.00 to 13.50
Low phos. punchings	13.00 to 13.50
Steel car axles	13.00 to 13.50

CHICAGO

Delivered Chicago district consumers:	
Per Gross Ton	
Heavy melting steel	\$9.25 to \$9.75
Automobile hvy. melt. steel	8.00 to 8.50
Shoreline steel	9.25 to 9.75
Hydraulic comp. sheets	8.25 to 8.75
Drop forge flashings	8.25 to 8.75
No. 1 busheling	8.00 to 8.50
Bolled carwheels	10.75 to 11.25
Railroad ties	10.75 to 11.25
Railroad leaf springs	10.75 to 11.25
Axis turnings	8.00 to 8.50
Steel couplers and knuckles	10.50 to 11.00
Oil springs	10.50 to 11.00
Axis turnings (elec. fur.)	8.00 to 8.50
Low phos. punchings	11.00 to 11.50
Low phos. plates, 12 in. and under	10.00 to 10.50
Cast iron borings	5.00 to 5.50
Short shoveling turnings	5.00 to 5.50
Machine shop turnings	4.50 to 5.00
Boringing rails	10.00 to 10.50
Steel rails, less than 3 ft.	10.75 to 11.25
Steel rails, less than 2 ft.	11.50 to 12.00
Angle bars, steel	10.00 to 10.50
Cast iron carwheels	10.00 to 10.50
Railroad malleable	9.00 to 9.50
Agricultural malleable	7.75 to 8.25

Per Net Ton

Iron car axles	\$13.50 to \$14.00
Steel car axles	12.50 to 13.00
No. 1 railroad wrought	8.75 to 9.25
No. 2 railroad wrought	8.00 to 8.50
No. 2 busheling	5.00 to 5.50
Locomotive tires, smooth	9.50 to 10.00
Pipe and flues	5.00 to 5.50
No. 1 machinery cast	8.50 to 9.00
Clean automobile cast	9.50 to 10.00
No. 1 railroad cast	7.50 to 8.00
No. 1 agricultural cast	7.50 to 8.00
Store plate	5.25 to 5.75
Grate bars	5.25 to 5.75
Brake shoes	6.00 to 6.50

PHILADELPHIA

Per gross ton delivered consumers' yards:	
No. 1 heavy melting steel	\$10.00 to \$10.50
No. 2 heavy melting steel	8.75
No. 1 railroad wrought	11.00 to 11.50
Bundled sheets	9.00
Hydraulic compressed, new	9.00 to 9.50
Hydraulic compressed, old	8.50 to 9.00
Machine shop turnings	5.00 to 5.50
Heavy axle turnings	8.50 to 9.00
Cast borings	5.00 to 5.50
Heavy breakable cast	10.00 to 10.25
Store plate (steel works)	8.00
No. 1 low phos. heavy	13.00 to 14.00
Couplers and knuckles	13.00 to 13.50
Bolled steel wheels	13.00 to 13.50
No. 1 blast furnace	5.00 to 5.50
Spec. iron and steel pipe	8.00
Shafting	15.25 to 16.25
Steel axles	15.50 to 16.00
No. 1 forge fire	9.00
Cast iron car wheels	10.50 to 11.00
No. 1 cast	10.50 to 11.50
Cast borings (chem.)	12.00 to 14.00
Steel rails for rolling	12.00

CINCINNATI

Dealers' buying prices per gross ton:	
Heavy melting steel	\$6.75 to \$7.25
Scrap rails for melting	8.00 to 8.50
Loose sheet clippings	3.00 to 3.50
Bundled sheets	5.50 to 6.00
Cast iron borings	4.50 to 5.00
Machine shop turnings	4.00 to 4.50
No. 1 busheling	5.50 to 6.00
No. 2 busheling	2.50 to 3.00
Rails for rolling	8.50 to 9.00
No. 1 locomotive tires	8.25 to 8.75
Short shov.	11.00 to 11.50
Cast iron carwheels	7.50 to 8.00
No. 1 machinery cast	7.75 to 8.25
No. 1 railroad cast	8.25 to 8.75
Burnt cast	5.75 to 6.25
Store plate	5.75 to 6.25
Agricultural malleable	7.75 to 8.25
Railroad malleable	7.75 to 8.25

CLEVELAND

Per gross ton delivered consumers' yards:	
No. 1 heavy melting steel	\$8.50 to \$9.00
No. 2 heavy melting steel	8.00 to 8.50
Compressed sheet steel	7.25 to 7.75
Light bundled sheet stampings	6.50 to 7.00
Drop forge flashings	7.50 to 8.00
Machine shop turnings	6.00 to 6.50
Short shoveling turnings	6.50 to 7.00
No. 1 busheling	7.50 to 8.00
Steel axle turnings	7.00 to 7.50
Low phos. billet crops	12.50 to 13.00
Cast iron borings	6.25 to 6.75
Mixed borings and short turnings	6.25 to 6.75
No. 2 busheling	6.25 to 6.75
No. 1 cast	10.50 to 11.00
Railroad grate bars	7.00 to 7.50
Store plate	6.50 to 7.00
Rails under 3 ft.	12.50 to 13.00
Rails for rolling	15.50 to 16.00
Railroad malleable	11.50 to 12.00
Cast iron carwheels	9.75 to 10.00

BUFFALO

Per gross ton, f.a.b. Buffalo consumers' plants:	
No. 1 heavy melting steel	\$10.00 to \$10.50
No. 2 heavy melting scrap	8.50 to 9.00
Scrap rails	9.50 to 10.00
New hydraulic, comp. sheets	8.50 to 9.00
Old hydraulic, comp. sheets	7.50 to 8.00
Drop forge flashings	8.50 to 9.00
No. 1 busheling	8.50 to 9.00
Hvy. steel axle turnings	6.50 to 7.00
Machine shop turnings	5.00 to 5.50
Knuckles and couplers	11.00 to 11.50
Coil and leaf springs	11.00 to 11.50
Bolled steel wheels	11.00 to 11.50
Low phos. billet crops	11.75 to 12.25
Short shov. steel turnings	5.50 to 6.00
Short mixed borings and turnings	5.50 to 6.00
Cast iron borings	5.50 to 6.00
No. 2 busheling	5.00 to 5.50
Steel car axles	10.50 to 11.00
Iron axles	10.50 to 11.00
No. 1 machinery cast	10.75 to 11.25
No. 1 cupola cast	9.00 to 9.50
Store plate	8.75 to 9.25
Steel rails, 3 ft. and under	12.00 to 12.50
Cast iron carwheels	10.00 to 10.50
Industrial malleable	10.50 to 11.00
Railroad malleable	10.50 to 11.00
Chemical borings	7.00 to 7.50

BOSTON

Dealers' buying prices per gross ton:	
No. 1 heavy melting steel	\$5.50 to \$6.00
Scrap T rails	5.50 to 6.00
Breakable cast	6.00 to 6.50
Machine shop turnings	1.75 to 2.00
Bundled skeleton, long	4.25 to 4.50
Forge flashings	4.25 to 4.50
Blast furnace scrap	2.00 to 2.50
Slitting	11.00 to 11.25
Steel car axles	10.50 to 11.00
Cast iron borings, chemical	6.00 to 7.00
Store plate	6.50

Per gross ton delivered consumers' yards:

Textile cast	\$7.50 to \$9.00
No. 1 machinery cast	7.50 to 9.00
Railroad malleable	11.00 to 11.50

NEW YORK

Dealers' buying prices per gross ton:	
No. 1 heavy melting steel	\$7.00 to \$8.00
No. 2 heavy melting steel	5.50 to 6.50
Heavy breakable cast	6.00 to 6.50
No. 1 machinery cast	7.00 to 7.50
No. 2 cast	6.25 to 6.75
Store plate	5.50 to 6.00
Steel car axles	11.50 to 12.00
No. 1 railroad wrought	7.50 to 8.00
No. 1 yard wrought, long	6.50 to 7.00
Spec. iron and steel pipe	4.50 to 5.00
Forge fire	5.50 to 6.00
Rails for rolling	8.00 to 8.75
Short shoveling turnings	2.50 to 3.00
Machine shop turnings	2.50 to 3.00
Cast borings	3.50 to 3.75
No. 1 blast furnace	2.00 to 2.50
Cast borings (chemical)	11.00 to 11.50
Unprepared yard iron and steel	3.50 to 4.00

Per gross ton, delivered local foundries:

No. 1 machinery cast	\$10.25
No. 1 hvy. cast (cupola size)	9.00
No. 2 cast	8.50

*For direct car loading only.
†Loading on barge.

BIRMINGHAM

Per gross ton delivered consumers' yards:	
Heavy melting steel	\$9.00
Scrap steel rails	10.00
Short shoveling turnings	6.50
Store plates	6.50
Steel axles	\$10.50 to 11.00
Iron axles	10.50 to 11.00
No. 1 railroad wrought	5.50
Rails for rolling	11.00
No. 1 cast	10.50
Tramway wheels	9.00 to 9.50
Cast iron borings, chem.	8.00

ST. LOUIS

Per gross ton delivered consumers' yards:	
Selected heavy steel	\$8.75 to \$9.25
No. 1 heavy melting	7.25 to 7.75
No. 2 heavy melting	6.25 to 6.50
No. 1 locomotive tires	9.50 to 10.00
Misc. stand-sec. rails	8.75 to 9.25
Railroad springs	9.00 to 9.50
Bundled sheets	6.00 to 6.50
No. 2 railroad wrought	7.50 to 8.00
No. 1 busheling	5.00 to 5.50
Cast iron borings and shoveling turnings	2.50 to 3.00
Rails for rolling	9.25 to 9.75
Machine shop turnings	2.50 to 3.00
Heavy turnings	5.50 to 6.00
Steel car axles	11.00 to 11.50
Iron car axles	12.50 to 13.00
No. 1 railroad wrought	5.50 to 6.00
Steel rails less than 3 ft.	10.75 to 11.25
Steel angle bars	9.00 to 9.50
Cast iron carwheels	7.00 to 7.50
No. 1 machinery cast	8.50 to 9.00
Railroad malleable	8.50 to 9.00
No. 1 railroad cast	8.50 to 9.00
Store plate	6.50 to 7.00
Agricult. malleable	8.50 to 9.00

DETROIT

Dealers' buying prices per gross ton:	
Heavy melting steel	\$7.00 to \$7.50
Borings and short turnings	5.00 to 5.50

ORES, FLUORSPAR, COKE, FUEL, REFRACTORIES

Lake Superior Ores

Delivered Lower Lake Ports

Per Gross Ton	
Old range, Bessemer, 51.5% iron	\$4.80
Old range, non-Bessemer, 51.50% iron	4.85
Mesabi, Bessemer, 51.50% iron	4.65
Mesabi, non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore

C.&F. Philadelphia or Baltimore

Per Unit	
Iron, low phos., copper free, 85 to 88% iron, dry Spanish or Algeria	9.50c.
Iron, low phos., Swedish, average 68% iron	9.50c.
Iron, basic or foundry, Swedish, aver. 65% iron	9c.
Iron, basic or foundry, Russian, aver. 65% iron	9c.
Manganese, Caucasian, washed 52%	26c.
Manganese, African, Indian, 44-48%	21c.
Manganese, African, Indian, 48-51%	24c.
Manganese, Brazilian, 46 to 48%	20c.

Per Net Ton Unit

Tungsten, Chinese, wolframite, duty paid, delivered	\$17.50 to \$18.50
Tungsten, domestic scheelite, delivered	17.00

Per Gross Ton

Chrome, 45%, Cr ₂ O ₃ , crude, c.i.f. Atlantic Seaboard	\$17.00
Chrome, 48%, Cr ₂ O ₃ , c.i.f. Atlantic Seaboard	20.00

*Quotations nominal in absence of sales.
†Nominal; no supplies available.

Fluorspar

Per Net Ton	
Domestic, washed gravel, 85-5 f.o.b. Kentucky and Illinois mines for all-rail shipment	\$15.50 to \$16.00
Same grade for Ohio River barge shipment for Kentucky and Illinois River landings	17.50
No. 2 lump, 85-5 f.o.b. Kentucky and Illinois mines	\$15.50 to 16.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic port, duty paid	19.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2 1/4% silicon, f.o.b. Illinois and Kentucky mines	30.00

COKE, COAL AND FUEL OIL

Coke

Per Net Ton	
Furnace, f.o.b. Connellsville	\$3.85
Prompt	
Foundry, f.o.b. Connellsville	\$4.60 to 5.10
Prompt	
Foundry, by-product, Chicago ovens, for delivery outside switching district	8.50
Foundry, by-product, delivered in Chicago switching district	9.25
Foundry, by-product, New England, delivered	11.00
Foundry, by-product, Newark or Jersey City, del'd	8.20 to 8.81
Foundry, by-product, Phila.	9.00

Long turnings	\$3.75 to \$4.25
No. 1 machinery cast	9.50 to 10.00
Automotive cast	10.00 to 10.50
Hydraulic, comp. sheets	7.00 to 7.50
Store plate	6.25 to 6.75
New factory busheling	6.00 to 6.50
Old No. 2 busheling	4.00 to 4.50
Sheet clippings	3.50 to 4.00
Flashings	6.00 to 6.50
Low phos. plate scrap	7.50 to 8.00

CANADA

Dealers' buying prices per gross ton:

	Toronto	Montreal
Heavy melting steel	\$5.50	\$5.50
Rails scrap	6.00	4.50
Machine shop turnings	2.50	2.50
Boiler plate	4.50	4.50
Heavy axle turnings	2.50	2.50
Cast borings	3.00	3.00
Steel borings	2.00	2.00
Wrought pipe	2.50	2.50
Steel axles	4.50	6.00
Axles wrought iron	4.50	6.50
No. 1 machinery cast	7.75	9.00
Store plate	4.50	5.00
Standard carwheels	7.25	7.00
Malleable	6.75	7.00

Foundry, by-product, Cleveland, delivered	\$9.25
Foundry, Birmingham	6.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry, by-product, del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	\$1.80 to \$2.05
Mine run coking coal f.o.b. W. Pa. mines	2.05 to 2.25
Gas coal, 1/4-in. f.o.b. Pa. mines	2.25 to 2.55
Mine run gas coal f.o.b. Pa. mines	2.05 to 2.45
Steam slack, f.o.b. W. Pa. mines	1.55 to 1.65
Gas slack, f.o.b. W. Pa. mines	1.90 to 2.10

Fuel Oil

Per Gal. f.o.b. Bayonne, N. J.	
No. 3 distillate	4.00c.
No. 4 industrial	3.50c.

Per Gal. f.o.b. Baltimore	
No. 3 distillate	4.00c.
No. 4 industrial	3.50c.

Per Gal. del'd Chicago	
No. 3 industrial fuel oil	3.85c.
No. 5 industrial fuel oil	3.35c.

Per Gal. f.o.b. Cleveland	
No. 3 distillate	5.50c.
No. 4 industrial	5.25c.
No. 5 industrial	4.90c.

REFRACTORIES

Fire Clay Brick

	Per 1000 f.o.b. Works	High-heat Intermediate	Duty Brick	Duty Brick
Pennsylvania	\$45.00			
Maryland	45.00			
New Jersey	55.00			
Ohio	45.00			
Kentucky	45.00			
Missouri	45.00			
Illinois	45.00			
Ground fire clay, per ton	7.00			

Chrome Brick

Per Net Ton	
Standard size	\$45.00

Silica Brick

Per 1000 f.o.b. Works	
Pennsylvania	\$45.00
Chicago	54.00
Birmingham	55.00
Silica clay, per ton	8.00

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Warehouse Prices for Steel Products

PITTSBURGH	
	Base per Lb.
Plates	3.15c.
Structural shapes	2.15c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.90c.
Cold-finished and screw stock	2.90c.
Rounds and hexagons	3.45c.
Squares and flats	3.45c.
Hoops and bands under 1/4 in.	3.20c.
Hot-rolled annealed sheets (No. 24), 25 or more bundles	3.30c.
Galv. sheets (No. 24), 25 or more bundles	3.95c.
Hot-rolled sheets (No. 10)	2.95c.
Galv. corrug. sheets (No. 28), per square (more than 3750 lb.)	\$3.60
Spikes, large	2.90c.
Track bolts, all sizes, per 100 count, 65 per cent off list.	
Machine bolts, 100 count, 65 per cent off list.	
Carriage bolts, 100 count, 65 per cent off list.	
Nuts, all styles, 100 count, 65 per cent off list.	
Large rivets, base per 100 lb.	\$3.50
Wire, black, soft ann'l'd, base per 100 lb.	\$2.70
Wire, galv. soft, base per 100 lb.	\$2.95
Common wire nails, per keg	\$2.334
Cement coated nails, per keg	\$2.334

On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applied to orders of 400 to 9999 lb.

*Delivered in Pittsburgh switching district.

CHICAGO	
	Base per Lb.
Plates and structural shapes	3.20c.
Soft steel bars	2.95c.
Cold-fn. steel bars:	
Rounds and hexagons	3.50c.
Flats and squares	3.50c.
Hot-rolled strip	3.30c.
Hot-rolled annealed sheets (No. 24)	3.35c.
Galv. sheets (No. 24)	4.00c.
Hot-rolled sheets (No. 10)	3.05c.
Spikes (keg lots)	3.50c.
Track bolts (keg lots)	4.00c.
Rivets, structural (keg lots)	3.65c.
Rivets, boiler (keg lots)	3.75c.
Per Cent Off List	
Machine bolts	60 and 5
Carriage bolts	60 and 5
Lag screws	60 and 5
Hot-pressed nuts, sq. tap. or blank	60 and 5
Hot-pressed nuts, hex. tap. or blank	60 and 5
Hex. head cap screws	80
Cup point set screws	70 and 10
Flat head bright wood screws, 37 1/2 and 18	
Spring cotters	80
Store bolts in full packages	70
Rd. hd. tank rivets, 7/16 in. and smaller	57 1/2
Wrought washers	\$4.50 off list
No. 8 black ann'l'd wire per 100 lb.	\$3.85
Comm. wire nails, base per keg	3.05
Cement c'd nails, base per keg	3.05

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets the base applies on orders of 400 to 9999 lb. All prices are f.o.b. consumers' plants within the Chicago switching district.

*No. 26 and lighter take special prices.

NEW YORK	
	Base per Lb.
Plates, 1/4 in. and heavier	3.40c.
Structural shapes	3.37c.
Soft steel bars, small shapes	3.22c.
Iron bars, swed. charcoal, 6.50c. to 7.25c.	
Cold-fn. shafting and screw stock:	
Rounds and hexagons	3.95c.
Flats and squares	4.42c.
Cold-roll. strip, soft and quarter hard	3.33c.
Hoops	3.55c.
Bands	3.55c.
Hot-rolled sheets (No. 10)	3.27c.
Hot-rolled ann'l'd sheets (No. 24*)	3.85c.
Galvanized sheets (No. 24*)	4.50c.
Long term sheets (No. 24)	5.20c.
Standard tool steel	11.00c.
Wire, black annealed (No. 10)	3.25c.
Wire, galv. (No. 10)	3.85c.
Tire steel, 1 x 1/4 in. and larger	3.65c.
Open hearth spring steel, 4.00c. to 10.00c.	
Common wire nails, base, per keg	\$3.21

	Per Cent Off List
Machine bolts, cut thread:	
All diameters	70
Carriage bolts, cut thread:	
All diameters	70
Boiler tubes:	Per 100 Ft.
Lap welded, 2-in.	\$18.05
Seamless welded, 2-in.	19.24
Charcoal iron, 2-in.	24.94
Charcoal iron, 4-in.	63.65

*No. 26 and lighter, 36 in. wide, 20c. higher per 100 lb.

ST. LOUIS	
	Base per Lb.
Plates and struc. shapes	3.44c.
Bars, soft steel or iron	3.19c.
Cold-fn. rounds, shafting, screw stock	3.74c.
Hot-rolled annealed sheets (No. 24)	4.09c.
Galv. sheets (No. 24)	4.79c.
Hot-rolled sheets (No. 10)	3.29c.
Black corrug. sheets (No. 24)	4.09c.
*Galv. corrug. sheets	4.79c.
Structural rivets	3.90c.
Boiler rivets	4.09c.
Per Cent Off List	
Tank rivets, 7/16 in. and smaller	55
Machine and carriage bolts, lag screws, fittings up bolts, bolt ends, pivot bolts, hot-pressed nuts, square and hexagon, tapped or blank, semi-finished nuts:	
1000 lb. or over	70 and 10
200 to 999 lb.	67 1/2 and 10
100 to 199 lb.	65 and 10
Less than 100 lb.	60 and 10

*No. 26 and lighter take special prices.

PHILADELPHIA	
	Base per Lb.
Plates, 1/4-in. and heavier	2.95c.
Structural shapes	2.95c.
*Soft steel bars, small shapes, iron bars (except bands)	2.90c.
*Reinforc. steel bars, sq. twisted and deformed	2.955c.
Cold-finished steel bars	3.75c.
*Steel hoops	3.40c.
*Steel bands, No. 12 and 3/16 in., incl.	3.15c.
Spring steel	5.00c.
*Hot-rolled anneal. sheets (No. 24)	3.55c.
*Galvanized sheets (No. 24)	4.25c.
*Hot-rolled annealed sheets (No. 10)	3.05c.
Diam. pat. floor plates, 3/4 in.	4.95c.
Swedish iron bars	6.25c.

These prices are subject to quantity differentials except on reinforcing and Swedish iron bars.

*Base prices subject to deduction on orders aggregating 4000 lb. or over.
†For 50 bundles or over.
‡For less than 2000 lb.

CLEVELAND	
	Base per Lb.
Plates and struc. shapes	3.31c.
Soft steel bars	2.85c.
Reinforc. steel bars	3.15c.
Cold-finished steel bars	3.40c.
Flat-rolled steel under 1/4 in.	3.36c.
Cold-finished strip	3.00c.
Hot-rolled annealed sheets (No. 24)	3.96c.
Galvanized sheets (No. 24)	4.61c.
Hot-rolled sheets (No. 10)	3.11c.
Hot-rolled 3/16 in. 24 to 48 in. wide sheets	3.56c.
Black ann'l'd wire, per 100 lb.	\$2.65
No. 9 galv. wire, per 100 lb.	3.00
Comm. wire nails, base per keg	2.40

*Plus mill. size and quantity extras.
†Outside delivery 10c. less.

CINCINNATI	
	Base per Lb.
Plates and struc. shapes	3.40c.
Bars, soft steel or iron	3.15c.
New billet reinforc. bars	3.25c.
Rail steel reinforc. bars	3.25c.
Hoops and bands, 3/16 in. and lighter	3.46c.
Cold-finished bars	3.70c.
Hot-rolled annealed sheets (No. 24)	4.00c.
Galv. sheets (No. 24)	4.70c.
Hot-rolled sheets (No. 10)	3.20c.
Structural rivets	4.55c.
Small rivets	35 per cent off list
No. 9 ann'l'd wire, per 100 lb. (1000 lb. or over)	\$2.91
Comm. wire nails, base per keg (1 to 24 kegs)	3.50
25 to 50 kegs	3.30
Larger quantities	2.10
Cement c'd nails, base 100-lb. keg	3.50
Chain, 1-in., per 100 lb.	8.35
Net per 100 Ft.	
Seamless steel boiler tubes, 2-in.	\$19.03
Lap-welded steel boiler tubes, 2-in.	18.10
4-in.	42.32

BUFFALO	
	Base per Lb.
Plates	3.25c.
Struc. shapes	2.25c.
Soft steel bars	2.00c.
Reinforcing bars	2.60c.
Cold-fn. flats and sq.	3.55c.
Round and hex.	3.55c.
Cold-rolled strip steel	3.15c.
Hot-rolled annealed sheets (No. 24)	4.05c.
Heavy hot-rolled sheets, 3/16 in., 24 to 48 in. wide	3.62c.
Galv. sheets (No. 24)	4.70c.
Bands	3.45c.
Hoops	3.45c.
Hot-rolled unannealed sheets	3.17c.
Comm. wire nails, base per keg	\$3.25
Black wire, base per 100 lb.	3.55c.

BOSTON	
	Per Lb.
Beams, channels, angles, tees, seas	3.52c.
H beams and shapes	3.52c.
Plates—sheared, tank and univ. mill, 1/4 in. thick and heavier	3.52c.
Floor plates, diamond pattern	3.33c.
Bar and bar shapes (mild steel)	3.33c.
Bands 3/16 in. thick and No. 12 ga. incl.	3.60c. to 4.60c.
Half rounds, half ovals, ovals and bevels	4.55c.
Tire steel	4.55c.
Cold-finished rounds and hexagons	5.25c.
Cold-rolled strip steel	3.34c.
Cold-finished squares and flats	5.75c.
Blue annealed sheets, No. 10 gal.	3.60c.
One pass cold-rolled sheets No. 24	4.15c.
Galvanized steel sheets, No. 24 ga.	4.85c.
Lead coated sheets, No. 24 ga.	5.80c.

Prices delivered by truck in metropolitan Boston, subject to quantity differentials.
*Base.

PACIFIC COAST			
	Base per Lb.		
	San Fran-	Los Angeles	Seattle
Plates, tank and U. M.	3.55c.	3.70c.	3.85c.
Shapes, standard	3.55c.	3.70c.	3.85c.
Soft steel bars	3.60c.	3.70c.	3.80c.
Reinforcing bars	3.50c.	3.50c.	3.90c.
Hot-rolled annealed sheets (No. 24)	4.40c.	4.45c.	4.40c.
Hot-rolled sheets (No. 10)	3.75c.	3.80c.	3.75c.
Galv. sheets, (No. 24)	5.00c.	5.05c.	5.00c.
Cold finished steel:			
Rounds	5.95c.	5.95c.	4.75c.
Squares and hexagons	7.20c.	7.20c.	6.90c.
Flats	7.70c.	7.70c.	7.00c.
Common wire nails —base per keg less carload	\$3.40	\$3.25	\$3.50
All items subject to differentials for quantity.			

New Bids Asked on Los Angeles Aqueduct

SAN FRANCISCO, Nov. 19.—Approximately 13,000 tons of steel are involved in two projects on which the Metropolitan Water District will take bids at Los Angeles early in December. The construction of the Monrovia and Pasadena tunnels and appurtenant works, under specification No. 77, will require 600 tons of reinforcing bars and 1850 tons of structural steel. On the second unit of the Colorado River aqueduct bids were rejected on five schedules under specification No. 75 and new bids will be taken Dec. 4, under specification No. 82. This unit calls for the construction of approximately 13 miles of conduit and siphons, requiring 4286 tons of reinforcing bars and 188 tons of miscellaneous steel. The bid of Western Pipe & Steel Co., for the construction of steel siphons, under

specification No. 75, was also rejected and new bids will be taken shortly. Approximately 4100 tons of plates and 170 tons of shapes will be required. The district will purchase the steel for the two projects shortly after the first of the year.

The program of making all school structures earthquake-proof continues in southern California. A number of awards of fair tonnage have been made for this work and several more are pending. This territory appears to be the only section of the Coast where private construction of any importance is being carried on.

The Bureau of Reclamation has taken bids at Denver, Colo., for the furnishing of 20,000 tons of steel sheet piling and 1000 tons of fabricated corner piling for the Grand Coulee dam, which is being constructed near Almira, Wash. It is reported that in case identical bids are submitted the method of award will

be decided in Washington by Secretary Ickes.

Scrap exports from the Pacific Coast continue active, with indications that the total movement for the year will approach 200,000 tons. The domestic market for finished products shows little activity and an upturn is not looked for before the next quarter.

Ford Complies

DETROIT, Nov. 20.—Ford Motor Co. has filed a compliance agreement under the automobile code. An executive of the Ford company filed a letter covering the matter at the White House on Nov. 5. Northwestern Motors Co., Ford dealer in the District of Columbia, is presumed to have been furnished a compliance agreement by Ford and has already bid on Government contracts and received Government orders in competition with other dealers.

Lead Prices Decline Ten Points in Week — Spelter Hits New Low Level

Zinc Quotation at 3.72½c. a lb., With Sales Somewhat Heavier—
Tin Trading Inaugurated at New York—Copper Demand Fair

NEW YORK, Nov. 20.—Demand continues to improve for copper and sales in the first 20 days of the month have amounted to nearly 10,000 tons. This is a considerable gain over business in the corresponding October period. The Blue Eagle price remains unchanged at 9c. a lb., delivered Connecticut Valley, and commitments are being taken for delivery up until March 1. The European market has been somewhat more quiet in the last week, with price fluctuations less pronounced. The London quotation this morning was 6.80c. a lb., usual Continental base ports. The copper code authority has issued a list of consumers who

have signed satisfactory buying agreements and are qualified to certify their products as containing only Blue Eagle copper. With a few minor exceptions the list includes all users who normally consume 50 tons or more of copper monthly.

Tin

This market continues rather quiet, but some activity is expected after Dec. 1 when tin plate makers will be permitted under the steel code to book orders for 1935. Until they are able to get some line on their own business they ordinarily are hesitant about contracting for tin requirements. A little more interest has

been shown in the tin market this week than was the case last, but sales have been light and price fluctuations confined to a 12½ point range. The market is quotable today at 51.20c. a lb. Sales abroad have also been light, and, with little movement in sterling, prices have held rather steady. Spot metal was quoted on first call in London this morning at £228 12s. 6d. and futures at £228 15s., while the market for Straits metal at Singapore was unchanged from a week ago at £230. Trading in Straits tin was inaugurated yesterday on the New York Commodity Exchange, but the first day's transactions amounted to only 15 tons.

Lead

Two five-point reductions during the past week have brought lead quotations down to 3.35c. a lb., St. Louis, and 3.50c., New York. The latest decline, announced yesterday, brought out considerable demand and improved buying for December delivery is expected this week. Next month's requirements are not nearly covered and consumption does not appear to be materially lower. The Joplin ore market is also off \$1 to \$2 a ton, with sales reported at \$30 to \$33 a ton. October statistics were somewhat disappointing to most sellers, lead stocks having been reduced only 360 tons during the month to 229,859 tons, as of Oct. 31. October shipments were off only slightly having fallen from 36,018 tons in September to 35,943 tons last month. Production, however, rose from 31,939 tons in September to 35,576 tons.

Zinc

After holding for several days at 3.75c. a lb., East St. Louis, the spelter price weakened on Friday and has since been quotable at 3.72½c., East St. Louis, and 4.07½c., New York. These quotations, the lowest of the year, brought out considerable demand and the week's sales amounted to about 4500 tons. A small amount of first quarter metal has been booked at the low levels. Ore prices advanced \$1 on the strength of heavier demand and the flotations and mill grades are now quotable at \$24 and \$25 a ton respectively. Ore sales last week were 5630 tons, while shipments were 4012 tons. Production, at 1900 tons, compared with 8000 tons in the previous week, and reflected the expected curtailment in output. This week is expected to see mine output again approach the 8000-ton level.

The Week's Prices. Cents Per Pound for Early Delivery

	Nov. 14	Nov. 15	Nov. 16	Nov. 17	Nov. 19	Nov. 20
Electrolytic copper, N. Y.*	8.75	8.75	8.75	8.75	8.75	8.75
Lake copper, N. Y.	9.12½	9.12½	9.12½	9.12½	9.12½	9.12½
Straits tin, Spot, New York	51.25	51.20	51.25	51.25	51.12½	51.20
Zinc, East St. Louis	3.75	3.75	3.72½	3.72½	3.72½	3.72½
Zinc, New York	4.10	4.10	4.07½	4.07½	4.07½	4.07½
Lead, St. Louis	3.45	3.45	3.40	3.40	3.35	3.35
Lead, New York	3.60	3.60	3.55	3.55	3.50	3.50

*Refinery quotations; price ¼c. higher delivered in Connecticut.
Aluminum, virgin 99 per cent plus, 19c. to 22c. a lb., delivered.
Aluminum, remelt No. 12 (alloy), carload lots delivered, 14c. a lb., average for week.
Nickel electrolytic cathode, 35c. a lb., delivered; shot and ingot, 36c. a lb., delivered.
Antimony, 11.87½c. a lb., New York.
Brass ingots, 85-5-5-5, 8.25c. a lb., New York and Philadelphia.

From New York Warehouse	
Delivered Prices, Base per Lb.	
Tin, Straits pig	52.50c. to 53.50c.
Tin, bar	54.50c. to 55.50c.
Copper, Lake	10.25c. to 11.00c.
Copper, electrolytic	10.00c. to 10.50c.
Copper, castings	9.75c. to 10.75c.
*Copper sheets, hot-rolled	16.00c.
*High brass sheets	14.25c.
*Seamless brass tubes	16.00c.
*Seamless copper tubes	16.25c.
*Brass rods	12.75c.
Zinc, slabs	5.75c. to 6.75c.
Zinc, sheets (No. 9), oaks, 1200 lb. and over	10.25c.
Lead, American pig	4.37½c. to 5.37½c.
Lead, bar	5.37½c. to 6.37½c.
Lead, sheets	7.25c.
Antimony, Asiatic	14.50c.
Alum., virgin, 99 per cent, plus	23.30c.
Alum., No. 1 for remelting, 98 to 99 per cent	18.00c. to 19.00c.
Solder, ½ and ½	31.00c. to 32.00c.
Babbitt metal, commercial grades	25.00c. to 60.00c.

*These prices are also for delivery from Chicago and Cleveland warehouses.

From Cleveland Warehouse	
Delivered Prices per Lb.	
Tin, Straits pig	55.50c.
Tin, bar	57.50c.

Copper, Lake	10.00c.
Copper, electrolytic	10.00c.
Copper, castings	9.75c.
Zinc, slab	5.75c. to 6.00c.
Lead, American pig	4.50c. to 4.75c.
Lead, bar	7.75c.
Antimony, Asiatic	9.00c.
Babbitt metal, medium grade	18.50c.
Babbitt metal, high grade	59.50c.
Solder, ½ and ½	33.25c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	5.50c.	6.25c.
Copper, hvy. and wire	5.37½c.	5.87½c.
Copper, light and bottoms	4.37½c.	4.87½c.
Brass, heavy	2.87½c.	3.50c.
Brass, light	2.12½c.	2.87½c.
Hvy. machine composition	4.50c.	5.00c.
No. 1 yel. brass turnings	3.75c.	4.25c.
No. 1 red brass or compos. turnings	4.00c.	4.50c.
Lead, heavy	2.75c.	3.12½c.
Zinc	2.00c.	2.37½c.
Cast aluminum	9.62½c.	10.75c.
Sheet aluminum	11.00c.	12.50c.

Societe Genevoise D'Instruments De Physique, Geneva, Switzerland, manufacturer of Swiss jig boring machines and high precision equipment, has appointed Triplex Machine Tool Corp., 125 Barclay Street, New York., as exclusive agent in the United States and Canada. This line was handled for many years by R. Y. Ferner Co., Washington, but since the recent death, R. Y. Ferner, the above change has been made.

HY-TEN "M" TEMPER

HIGH CARBON NI-CR-MO ALLOY STEEL

HARD AND TOUGH WHEN OIL-HARDENED

ANNEALED ROUND AND FLAT SECTIONS IN STOCK

WHEELOCK, LOVEJOY & COMPANY, Inc.

CAMBRIDGE

CHICAGO

CLEVELAND

DETROIT

Fabricated Structural Steel

Lettings Decline—New Projects in Small Volume

AWARDS of 6425 tons are only about one-half of the tonnage reported a week ago and are the lowest since the last week in September. A State highway bridge at Leechburg, Pa., will require 1200 tons, and tunnel supports at Los Angeles, 1060 tons, are the only sizable bookings. New projects of 7625 tons compare with 13,325 tons in the previous week and 7000 tons two weeks ago. Bids for 21,000 tons of sheet steel piling for the Grand Coulee low level dam, Almira, Wash., are under advisement. Structural steel awards for the week follow:

NORTH ATLANTIC STATES

Worcester, Mass., 200 tons, Plantation Street bridge, to McClintic-Marshall Corp.

Lawrence, N. Y., 685 tons, high school, to Bethlehem Fabricators, Inc.

Phoenix, N. J., 100 tons, ore storage building, to Belmont Iron Works.

Delaware & Hudson Co., 180 tons, bridge at Windsor, N. Y., to McClintic-Marshall Corp.

Leechburg, Pa., 1200 tons, State highway bridge, to McClintic-Marshall Corp.

Washington, 565 tons, 69 lookout towers for Department of Agriculture, to Aermotor Co.

THE SOUTH

Atlanta, Ga., 640 tons, Peters Street viaduct, to Virginia Bridge & Iron Co.

Baton Rouge, La., 195 tons, wharf approach for Solvay Process Co., to R. C. Mahon Co.

Baton Rouge, La., 295 tons, movable bridge for Solvay Process Co., to R. C. Mahon Co.

CENTRAL STATES

Springfield, Ohio, 100 tons, highway spans, to Champion Bridge Co.

Motley, Minn., 210 tons, State highway bridge, to Minneapolis-Moline Power Implement Co.

State of Nebraska, 695 tons, bridges; 150 tons to McClintic-Marshall Corp.; 440 tons to Omaha Steel Works, and 105 tons, to Pittsburgh-Des Moines Steel Co.

WESTERN STATES

Seattle, 170 tons of structural for Diablo power house, to Wallace Bridge & Structural Steel Co.; 100 tons sheet piling, to A. M. Castle & Co.

Los Angeles, 120 tons, two cranes for city, to Harnischfeger Sales Corp.

Los Angeles, 1060 tons, for tunned supports, to Commercial Shearing & Stamping Co.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

Providence, R. I., 100 tons, State office building.

Roselle, N. J., 150 tons, Catholic Church.

Cumberland, Md., 400 tons, high school building.

Washington, 1245 tons, black and galvanized shapes for cruisers Brooklyn and Honolulu; bids Dec. 4.

Washington, 130 tons, shapes for cruisers Brooklyn and Honolulu; bids Nov. 30.

THE SOUTH

Belle, W. Va., 150 tons, building for Du Pont Co.

CENTRAL STATES

Cleveland, 175 tons, sheet steel piling for Westerly sewage disposal plant; bids Nov. 23.

Cleveland, 3050 tons, Lorain Road bridge for State Highway Department; Lowensohn Construction Co., Cleveland, general contractor.

State of Illinois, 450 tons, bridges.

State of Missouri, 225 tons, bridges.

Muscatine, Iowa, 2500 tons, dam across Mississippi River; bids postponed to Dec. 4.

Des Moines, Iowa, 650 tons, post office; Hanson Brothers Co., Chicago, low bidder.

Chicago, Burlington & Quincy Railroad, 165 tons, bridge at Golden, Ill.

Toledo, Ohio, 500 tons, plant for Owens Bottle Co.

Hartsdale Junction, Ind., 500 tons, State highway bridge.

Dearborn, Mich., 500 tons, alterations to production foundry for Ford Motor Co.

McCooks, Neb., 200 tons, State highway bridge.

State of Nebraska, 220 tons, highway bridges.

Jefferson, Wis., 250 tons, Racine Street bridge; bids about Feb. 1.

WESTERN STATES

Townsend, Mont., 210 tons, State highway bridge; bids Nov. 27.

Yellowstone National Park, Wyo., 250 tons, utility and apartment buildings; bids Dec. 17.

Long Beach, Cal., 110 tons, Franklin Junior High School gymnasium; plans completed.

Los Angeles, 1850 tons, Monrovia and Pasadena tunnels for Metropolitan Water District, Specification No. 77; bids Dec. 17.

Almira, Wash., 21,000 tons sheet piling for Grand Coulee low level dam; bids under advisement.

FABRICATED PLATE

AWARDS

Batavia, N. Y., 955 tons, elevated municipal water tank, to Pittsburgh-Des Moines Steel Co.

Baton Rouge, La., 825 tons, steel barges for Solvay Process Co., to St. Louis Shipbuilding Co.

Brawley, Cal., 120 tons, city tank, to Chicago Bridge & Iron Works.

Washington, 420 tons, plates for heavy cruiser Wichita; bids Dec. 7.

Reinforcing Steel

Awards 2160 Tons—New Projects 12,610 Tons

Norwood, Mass., 100 tons, railroad bridge, to Truscon Steel Co.

South Dennis, N. J., 125 tons, highway construction, to an unnamed bidder.

Bristol, Conn., 100 tons, highway mesh, to American Steel & Wire Co.

Cincinnati, 200 tons, addition to Western & Southern Life Insurance Co. building, to Pol-lak Steel Co.

Pasadena, Cal., 211 tons, Garfield school alterations, to Truscon Steel Co.

Pasadena, 100 tons, Madison school alterations, to Graham Brothers.

Pasadena, 100 tons, Lincoln school alterations, to Blue Diamond Corp.

Los Angeles, 325 tons, California Fruit Growers Exchange building, to Concrete Engineering Co.

Los Angeles, 125 tons, Graybar Electric Co. warehouse, to Graham Brothers.

Norwalk, Cal., 107 tons, school, to Blue Diamond Corp.

San Diego County, Cal., 100 tons, State bridge over Escondido Creek, to Blue Diamond Corp.

Long Beach, Cal., 164 tons, alterations on Polytechnic and Woodrow Wilson schools, to Concrete Engineering Co.

Ontario, Cal., 100 tons, mausoleum, to Blue Diamond Corp.

San Jose, Cal., 165 tons, Visona dam and canal, to Gunn-Carle Co.

San Francisco, 132 tons, Woodlawn mausoleum, to W. S. Wetenhall Co.

NEW REINFORCING BAR PROJECTS

Revere, Mass., 140 tons, bridge.

Cleveland, 140 tons, Westerly sewage disposal plant; bids Nov. 23.

Springfield, Ill., 375 tons, waterworks; previously reported at 200 tons.

Decatur, Ill., 160 tons, waterworks.

Urbana, Ill., tonnage being estimated, post office.

Crown Point, Ind., tonnage being estimated, post office.

Des Moines, Iowa, 350 tons, post office; Hanson Brothers, Chicago, low bidders on general contract.

Milwaukee, 4000 tons, filter plant; Powers-Thompson Co., Joliet, Ill., low bidder.

Hammond, Ind., 900 tons, filter plant.

Fort Peck, Mont., 18,000 tons; Kansas City Bridge Co. and Massman Construction Co., Kansas City, low bidders on general contract.

Los Angeles, 6000 tons, Monrovia and Pasadena tunnels, Specification No. 77; bids on general contract Dec. 17, to be taken by Metropolitan Water District.

Los Angeles, 4286 tons, 12.8 miles conduit and siphons on Colorado River aqueduct, Specification No. 82; bids on general contract Dec. 4, to be taken by Metropolitan Water District.

Oakland, Cal., 400 to 500 tons, County court house; bids Dec. 12.

Gunnison, Colo., 221 tons, Taylor Park dam; bids on general contract Feb. 18, to be taken by Bureau of Reclamation.

Yellowstone National Park, Wyo., 190 tons, utilities and apartment buildings; bids Dec. 17.

East Bay Municipal Utility District, Oakland, Cal., will take bids Nov. 28 on 300,000 sq. ft. of welded steel fabric.

Scrap Stronger At St. Louis

ST. LOUIS, Nov. 20.—Scrap prices are firmer as a result of scarcity of material, coupled with the desire of dealers and brokers to cover short sales before the end of the year and a firming up of the Cleveland and Chicago markets. Dealers' prices on No. 1 and No. 2 heavy melting steel and miscellaneous standard-section rails are 25c. a ton higher; on railroad springs they are up 50c. a ton. A list of several thousand tons of scrap sold by the Mobile & Ohio will go for export. The Missouri Pacific Railway has issued a list of 55 carloads.

Further improvement has occurred in the pig iron market as has been the case weekly since September. Sales and shipments are heavier, although no large orders are being placed, and the melt is heavy in all lines except the heavy industries. The warm weather has caused a slight slowing down in the stove business, but it is still considerably better than it was at this time last year.

TONS of CARBOLOY

CEMENTED CARBIDES

REG. U.S. PAT. OFF.



A Summary of 100 Jobs

An analysis of more than 100 applications selected at random and embodying a representative cross-section of machining operations, materials and industries, reveals the following interesting performance of Carboly Tools: Average Speed Increase: Steel: 115%, Cast Iron 153%, Aluminum Alloys 238%, Brass, Bronze, Copper 297%, Non-metallic substances 175%. Average ratio of tool life between grinds, Carboly vs. previous tools: Steel: 121%, Cast Iron 291%, Aluminum Alloys 321%, Brass, Bronze, Copper 361%, Non-metallic materials 301%.

These figures are not presented with the idea of setting up a standard of practice but are intended to serve as some indication of the average performance of Carboly tools on representative applications.

...have established convincing proof of a new order of economical performance

The record of Carboly tool and die economy is not based upon isolated cases of unusual performance. It is a record solidly founded upon the application of several TONS of Carboly cemented carbide over a period of more than five years. It covers practically all machining operations on ferrous, non-ferrous and non-metallic materials. It reaches into practically all types of industries engaged in the fabrication of these materials.

It is upon this diversified background of accumulated experience in applying Carboly tools that your Carboly representative bases his recommendations to you.

Rapid dissemination of performance reports from the Carboly organization-at-large currently supplements the personal experiences of each Carboly representative and enables him to give you at all times the latest, most economical recommendations.

Consult your Carboly representative with confidence—whether it be for a single application or for the tooling of an entire series of operations. He is prepared to furnish cost-saving facts applied to your jobs before you spend a single penny for Carboly tools.

CARBOLOY COMPANY INC.

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CHICAGO
CLEVELAND

PHILADELPHIA

NEWARK
PITTSBURGH

Nearly all lines of finished iron and steel are quiet. The slowing down is attributed to the annual movement to hold down inventories as the year draws to a close.

Better Sheet Demand At Cincinnati

CINCINNATI, Nov. 20.—With fourth quarter business definitely disappointing, district pig iron sellers are looking toward the new year. The market has continued in a steady rut throughout the third and the expired portion of the fourth quarter, with bookings hovering near 300 tons a week. This represents solely current needs of melters. Foundry operations fluctuate within narrow limits, with stove foundries reporting the greatest amount of business. A slight flurry among automotive melters is

noted, but this has not had strong market reactions.

By-product foundry coke continues to move in steady volume, but contracts are still held to 30-day commitments. Beehive coke is dull.

Miscellaneous demand for sheets has increased, more than offsetting a slight easing of automotive specifications. The interesting development of the week was the improved demand from jobbers, who specified for a fair amount of tonnage in the aggregate. Mill production exceeds 40 per cent of capacity.

Stronger scrap markets in other districts tend to improve the market tone in this area, although business is without feature. Some open-hearth material has been ordered by a mill heretofore out of the market, but the tonnage was not great. Price schedules are unchanged and yard supplies intact.

"HERCULES" RED-STRAND WIRE ROPE

Furnished in Flattened Strand, Round Strand, Preformed, Steel Clad and Non-Rotating constructions.



A GIANT
in Strength and
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MADE ONLY BY
A. Leschen & Sons Rope Co.

ESTABLISHED 1857
5909 KENNERLY AVENUE
ST. LOUIS, MO.

NEW YORK
CHICAGO
DENVER
SAN FRANCISCO

National Founders Reappraise the New Deal

(Continued from Page 38)

the Bonneville, the Grand Coulee, Boulder Dam, Fort Peck, Caspar Alcovia, and Loop River. In all these territories the present power capacity is more than ample to meet requirements."

Summing up his recommendations Mr. Pangborn said:

"1. We must balance the Federal budget. Business can find no encouragement in a tendency toward financial instability in government.

"2. We must reduce Federal relief. Reduced expenditures and a sound financial program would be the go-ahead sign for business which is the real method of affording unemployment relief.

"3. We must stabilize our currency. Business is ready to contend with economic hazards but it cannot gamble with political hazards.

"4. Government must remove itself from the field of competition with its own citizens and taxpayers.

"5. Government must discontinue the policy of construction of public works projects in fields already amply served by private enterprise.

"6. A labor truce should be declared. This is no time to attempt innovations in labor relationships.

Recommends Status Quo in Industrial Relations

"Section 7a has not clarified those relationships. Instead confusion, destruction, loss of capital and wages thus far tend to retard re-

covery. Let us maintain a status quo: whatever has been the method of bargaining with employees, whether closed shop, open shop, individual bargaining, or employee representation plan, let it remain as it is with neither employer nor employee seeking to take advantage of unusual conditions. That would put a stop to this agitation and endless argument. Attention could then be centered on the real objective: that of stimulating national business recovery. Our present sensitive economic machinery should not be made to promote the interests of any special group. Status quo in labor relations at this time would do much to steady our commercial and industrial ship. Upon its progress all must alike depend. Labor cannot sink capital without sinking itself also."

We Are Living on Principal

TOUCHING on the subject of Government spending, Mr. Milholland said: "Debt cannot be created without a day of reckoning, and if it was unwisely created, the reckoning is going to be painful. We are living on principal. It is time to stop."

Stating that the subject of Government debt was dealt with two years ago by a man of long experience in public affairs, he quoted that authority as follows:

"We all know that our own family credit depends in large part on the stability of the credit of the United States.

"And here at least is one field in which all business, big business and little business and family business and the individual's business, is at the mercy of our big Government down in Washington.

"If the nation is living within its income, its credit is good.

"But if, like a spendthrift, it throws discretion to the winds, is willing to make no sacrifice at all in spending, extends its taxing to the limit of the people's power to pay and continues to pile up deficits, it is on the road to bankruptcy.

"Most of this new Government-created credit has been taken to finance the Government's continuing deficits.

"The truth is that the banks are financing these stupendous deficits and that the burden is absorbing their resources.

"All this is highly undesirable and unnecessary. It arises from one cause only, and that is the unbalanced budget and the continued failure of this administration to take effective steps to balance it."

These sentiments, Mr. Milholland said, were expressed on Oct. 19, 1932, by Franklin D. Roosevelt.

The speaker stated that the banks can probably be influenced to increase their present large holdings of Government obligations, but if the time should come when they would demur the nationalization of credit would be demanded.

"That," he asserted, "simply means forced loans. No government whose financial policies inspire confidence has any need to find a home for its obligations, because the capital markets of the world will gladly absorb its offerings as long as the risk is a good one. But if the risk is not a good one, if a sufficient number of people distrust its policies and do not wish to buy its bonds, nationalization of the banking system is not going to cure the difficulty in the long run, because a man who does not want to buy a certain bond himself will not want his bank to buy it. If he believes his bank has too many of such bonds, he will withdraw his money.

"Credit cannot be forced. It cannot be created by proclamation. It must be cultivated with care and vigilantly protected.

"But suppose a government does not heed the warnings given by the securities markets in the form of reluctance to lend, even at rising rates, what then? Suppose it has obligations outstanding which it cannot meet or renew. A corporation, under similar circumstances, has to go into receivership, but a government cannot; there are essential services which must go on to prevent chaos.

The Road to the Printing Press

"What happens? Do we need to ask?

"A government invokes its sovereign power to issue currency and the results have always been the same. Such currency becomes worth less and less, because money is not wealth and

does not represent wealth when so issued; therefore more and more has to be issued to meet the bills; the more that is issued, the more worthless it becomes. Unless the process is checked—and it seldom is—the accumulated savings of the people in the form of money or savings accounts or insurance policies are wiped out.

"I am not saying this is going to happen. There is no reason why it should if we realize the dangers which lie at the end of the road we are traveling, and choose a different road.

"But it is because those dangers are apprehended by the business community that there is reluctance to go forward."

Pipe Lines

Empire Gas & Fuel Co., 78 North Main Street, Wellsville, N. Y., has approved plans for 8-in. welded steel pipe line for natural gas from Greenwood, N. Y., to connection with system of Hornell Gas Light Co., near Hornell, N. Y. Cost over \$40,000.

San Diego, Cal., has approved bond issue of \$350,000 for six miles of 48-in. welded steel pipe in connection with El Capitan-Lakeside pipe line for trunk water service. Alternate proposals will be asked for cast iron and concrete pipe. Fred D. Pyle, city hydraulic engineer, is in charge.

Halley, Idaho, has awarded contract to Babcock & Wilcox Co., Denver, for 11-in. steel water pipe at \$20,005.

United States Engineer Office, Jacksonville, Fla., closed bids Nov. 15 for rivet weld steel shore pipe (Proposal 487).

Southern Ontario Gas Co., Chatham, Ont., has authorized 6¼-in. welded steel pipe line from point in Dover natural gas field to connection with main trunk line in Kent County, about 11 miles.

Ramapo Gas Corp., Orangetown, N. Y., is considering extensions in gas pipe lines.

Board of Education, Los Angeles, closed bids Nov. 14 for black steel and galvanized steel pipe (Bid No. 1922).

Railroad Equipment

Atchison, Topeka & Santa Fe has placed an order with Winton Engine Co. for a 3600-hp. Diesel-electric locomotive.

Northern Pacific is inquiring for 24 lightweight de luxe coaches.

Missouri Pacific will install air-conditioning equipment in 89 passenger cars and one business car at cost of about \$596,125. Work will be done in company's shops.

RAILS

Norfolk & Western has ordered 7500 tons of 131-lb. rails from Carnegie Steel Co. and 2500 tons from Bethlehem Steel Co.

Lorain Steel Co. has been awarded 140 tons of crane rails for Boulder City, Nev.

Bethlehem Steel Co. has been awarded 490 tons of material for use at Fort Peck, Mont.

Wheeling & Lake Erie will buy rails for relocation of 27 miles of track in Muskingum Valley Conservancy, central Ohio.

Baltimore & Ohio will buy rails for relocation of 18 miles of track in Muskingum Valley Conservancy, central Ohio.

Pennsylvania Railroad will buy rails for relocation of 10 miles of track in Muskingum Valley Conservancy, central Ohio.

When You Are Using Sulphuric Acid . . .

Use equipment that is sulphuric acid proof

DURIRON

"DURIRON" will handle sulphuric acid in all concentrations and at all temperatures. It is available in pumps from 1" discharge to 8" discharge, valves, pipe and fittings, steam jets and numerous other standard items as well as in special castings.

DURIMET

FOR a machinable alloy, "Durimet," a nickel-chromium-silicon *low carbon* alloy steel is ideal for sulphuric under oxidizing conditions: for all concentrations at room temperature; for boiling up to 15% concentration with or without oxidizing salts such as ferric sulphate.

ALCUMITE

FOR sulphuric acid under non-oxidizing conditions, "Alcumite," a copper base aluminum iron alloy, is a most satisfactory machinable alloy. In it, too, are produced pumps, valves, pipe fittings, and other standard items including special castings and hot rolled rod.

WHEN it comes to Sulphuric Acid, come to The Duriron Company for something to handle it.

And for Muriatic Acid, "Durichlor" is equally satisfactory

THE DURIRON COMPANY, Inc.

438 N. Findlay Street

Dayton, Ohio

Manufacturers of Corrosion-Resisting Equipment in

Duriron

Durichlor

Durimet

Durco Alloy Steels

Alcumite

Cast Iron Pipe

Clinton, S. C., closed bids Nov. 20 for 19,600 ft. of 10-in. for water supply line. Harwood Beebe Co., Spartanburg, S. C., is consulting engineer.

Deming, N. M., will take bids soon for about 8600 ft. of 6-in. for water line and 400,000-gal. elevated steel tank on 100-ft. steel tower. A. J. Noyes is superintendent of water department.

Eugene, Ore., plans water pipe lines in College Crest district. Fund of \$25,000 has been secured through Federal aid.

Bowdon, Ga., asks bids until Nov. 27 for 13,580 ft. of 2 and 6-in. for water system; also for motor-driven pumping equipment. J. B. McCrary Engineering Corp., Atlanta, Ga., is consulting engineer.

Avery, Tex., closes bids about Dec. 10 for 17,410 ft. of 1¼, 6 and 8-ft. galvanized pipe for water system; also for 50,000-gal. elevated steel tank and tower. D. C. Walmsley, Thomas Building, Dallas, Tex., is consulting engineer.

Marion, Wis., plans water pipe lines. Bond issue of \$62,000 has been approved. A. E. McMahon Engineering Co., Menasha, Wis., is consulting engineer.

Hardy, Ark., will soon take bids for water pipe lines. Fund of \$33,000 has been arranged for this and other waterworks. H. R. Carter, National Standard Building, Little Rock, Ark., is engineer.

East Canton, Ohio, plans about 3½ miles of pipe for water system; also 100,000-gal. elevated steel tank and tower. Fund of \$57,000 is being arranged for this and other waterworks. R. M. Rice, Canton, Ohio, is consulting engineer.

Gulf Water Co., Inc., Times Building, St. Petersburg, Fla., plans about 17 miles of 6 and 8-in. for new pipe line in Pinellas County, for which franchise has been secured. Pumping plant, tanks and towers, etc., also will be installed.

Morton, Tex., will soon take bids for water pipe lines; also for pumping machinery and accessories. H. N. Roberts, 2415 Twentieth Street, Lubbock, Tex., is consulting engineer.

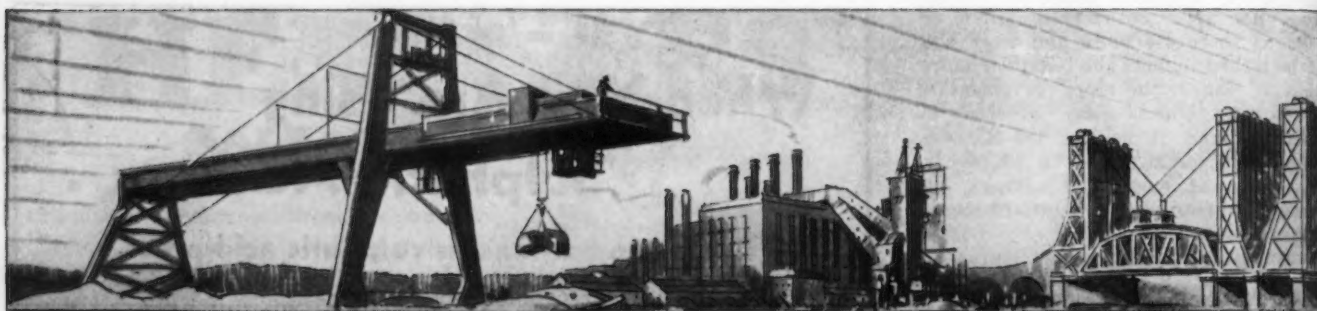
Chicago has placed 320 tons of 36-in. with James B. Clow & Sons.

Chicago will open bids next week on 100 tons of 6-in.

Hilbert, Wis., has placed 5500 lin. ft. of 6 and 8-in. for fire protection system with James B. Clow & Sons.

Ogden, Utah, Bureau of Reclamation has taken bids for 230 tons for Pine View dam.

The Iron Age, November 22, 1934—71



PLANT EXPANSION AND EQUIPMENT BUYING

Purchases by Army Dominate Tool Market—Automotive Buying Light

WITH the War Department taking bids this week on part of its extensive list, market interest is centered in Washington. The entire list calls for tools to cost \$2,300,000. Bids on the remainder of the equipment will be taken Dec. 3 and 4.

A Canton, Ohio, maker of Diesel motors has recently purchased a considerable amount of equipment including some used tools. The automotive industry is temporarily quiescent as a tool buyer, but additional large orders from Ford are expected before the end of the year. Machine tool inquiry generally is coming out in good volume, but orders actually being placed are mostly for single tools.

◀ NORTH ATLANTIC ▶

Mack International Motor Truck Corp., 25 Broadway, New York, manufacturer of motor trucks and parts, main plant at Plainfield, N. J., has plans for new multi-story factory branch, storage and distributing plant at 604 West Forty-third Street, on leased site. Cost over \$100,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Nov. 27 for six motor-driven coil-winding machines and spare parts (Schedule 3738), motor-driven turbine gland leak-off exhausters and spare parts (Schedule 3722) for Brooklyn, Philadelphia and Charleston, S. C., navy yards; until Dec. 4, reaction blading material for turbine units (Schedule 3769) for Brooklyn yard; four oil and water separators and spare parts (Schedule 3753) for Brooklyn and Philadelphia yards; anchor shackles, hooks, wire rope thimbles, etc. (Schedule 3767) for Brooklyn and Puget Sound yards; hacksaw blades (Schedule 3765) for Brooklyn and Mare Island yards; ship scrapers and 24 sets machinists' scrapers (Schedule 3759) for Brooklyn, San Diego, Mare Island and other yards.

M. J. Morrissey, Inc., 403 East 123rd Street, New York, manufacturer of motor truck and heavy wagon bodies, etc., has leased one-story factory at 1165 Randall Avenue, Bronx, totaling about 10,000 sq. ft. floor space for new plant, increasing present capacity.

Hobart & Peers, Inc., New York, has been organized by William H. Hobart, 9049 180th Street, Jamaica, L. I., and Campbell W. Peers, 1328 Nelson Avenue, Bronx, to manufacture elevators and elevator equipment and devices.

Signal Supply Officer, Army Base, Brooklyn, asks bids until Dec. 3 for 400 legs for signal equipment (Circular 49).

Board of Education, Hempstead, L. I., plans manual training equipment in new two-story high school, for which general contract has been let to J. J. Dixon Construction Co., Roosevelt, L. I. Cost about \$155,000.

Fleer Brothers, 281 Tompkins Avenue, Brooklyn, coal, oil, coke, etc., have filed plans for new coal pocket, with conveying, loading and other mechanical equipment. Cost about \$33,000 with equipment.

New York Dressed Poultry Terminal, Inc., New York, recently organized, Dennis P. Kennedy, president, care of Harry Schneider, architect, New York Central Railroad Co., 466

Lexington Avenue, has filed plans for four-story meat-packing plant, 67 x 102 ft., at 445-47 West Thirteenth Street. Cost about \$100,000 with equipment. Property will be owned by railroad noted and occupied under lease.

Turner Automatic Devices, Inc., New York, has been organized by Hughes Turner, Hotel Shelton, Forty-ninth Street and Lexington Avenue, and William Howell, 135 East Thirty-ninth Street, to manufacture automatic equipment and devices, and other equipment.

Cargill Grain Co., 141 West Jackson Boulevard, Chicago, plans new storage and distributing gallery at dock at Albany, N. Y. Cost about \$60,000 with elevating, loading and other mechanical equipment.

Eureka Oil Corp., 68 New Lots Avenue, Brooklyn, has leased one-story building at Long Island City, for new oil products plant, including department for blending lubricating oils, greases, etc., with storage and distributing divisions.

Black Prince Distilleries, Ltd., Schiedam, Netherlands, Peter J. Moloney, vice-president and treasurer, is closing negotiations for purchase of former plant of Soytex Mfg. Co., Nutley, N. J., and will remodel for production of Holland gin and other liquors, with storage and distributing units. Cost over \$85,000 with equipment.

Roselle Foundry Co., Roselle, N. J., has been organized by Edward H. Zoll and C. Parker Morgan, care of Donald D. Hand, 125 Broad Street, Elizabeth, N. J., representative, capital \$100,000, to manufacture brass, bronze, aluminum and kindred metal castings.

J. Wolfe Golden, 909 Walnut Street, Philadelphia, has leased one-story building at 135 North Twenty-second Street, for new general machine shop.

Quartermaster Depot, Twenty-first and Johnson Streets, Philadelphia, asks bids until Dec. 6 for one portable electric lifter (Circular 167).

◀ NEW ENGLAND ▶

General Plate Co., Forest Street, Attleboro, Mass., manufacturer of welded plates, wire and metal tubing, etc., has let general contract to Rowley Construction Co., 260 Central Avenue, Pawtucket, R. I., for two-story addition. Cost about \$34,000 with equipment.

Commanding Officer, Springfield Armory, Springfield, Mass., asks bids until Nov. 26 for 1300 pieces, non-flexible cables, 1/16-in. diameter, 11 ft. 8 in. long, and 1300 pieces Bowden type casings (Circular 34).

C. & W. Tool Co., Boston, has been organized by Lee S. Merrill and Howard A. Cutler, 49 Federal Street, to manufacture tools, dies and kindred specialties.

Commanding Officer, Navy Yard, Charlestown, Mass., is considering rebuilding of acetylene gas-manufacturing division at yard, used for welding and other service, recently destroyed by fire. Loss over \$150,000 with machinery.

Board of Education, Waltham, Mass., plans manual training department in new multi-story senior high school for which bids will soon be asked on general contract. Cost \$250,000. Financing has been arranged. Kilham, Hopkins & Greeley, and Daniel W. Gibbs, 126 Newbury Street, Boston, are architects.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Nov. 27 for 29,000terne plate containers (Schedule 3656) for Newport, R. I., Navy Yard.

Boston Elevated Railway Co., 31 St. James Avenue, Boston, has let general contract to Franklin Construction Co., Medford, Mass., for one-story addition to car shops and car house, 16 x 190 ft., at Watertown, Mass. Cost over \$35,000 with equipment.

◀ OHIO AND INDIANA ▶

Closure Service Co., 2042 Hawthorne Street, Toledo, Ohio, manufacturer of bottle caps, stoppers, etc., affiliated with Owens-Illinois Glass Co., 965 Wall Street, is concluding purchase of former plant of Toledo Bridge & Crane Co., Dorr Street and Westwood Avenue. New owner will remodel buildings for new plant.

Metal Cutting Tool Service, Inc., Toledo, Ohio, has been organized by H. Henry Miller and George E. Reed, care of William F. Miller, Nicholas Building, representative, to manufacture metal-cutting tools and operate mechanical works.

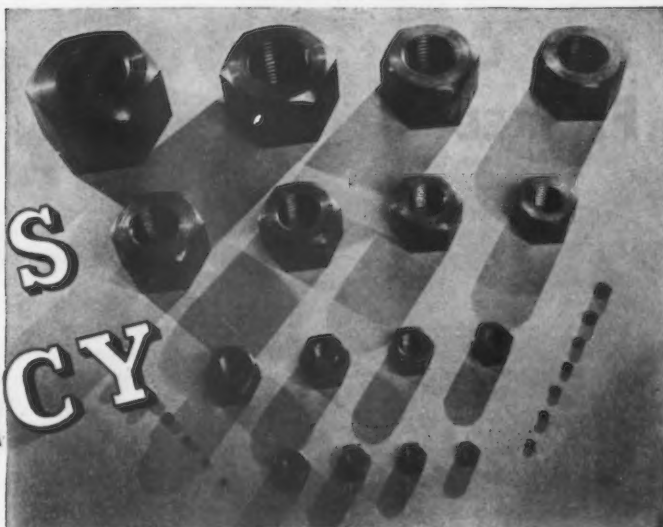
Department of Public Service, Ravenna, Ohio, George Krause, director, plans early call for bids for new elevated steel tank and tower for municipal water system.

Twin Motor Coach Co., Kent, Ohio, manufacturer of motor street cars, motor buses, etc., has asked bids on general contract for one-story addition. Cost over \$35,000 with equipment.

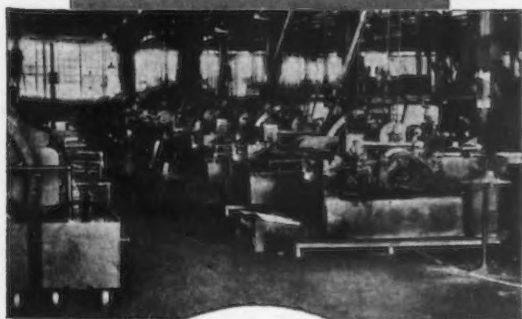
Material Division, Air Corps, Wright Field, Dayton, Ohio, asks bids until Nov. 26 for two power hack saws, complete with motors, etc. (Circular 316), six universal propeller protractors (Circular 311); until Nov. 28, 150 computer assemblies, altitude correction (Circular 308), 350 thermocouple indicator assemblies (Circular 302); until Nov. 30, one electric furnace (Circular 314), 26 gear type trolleys (Circular 313); until Dec. 3, one box type electric heat-treating furnace (Circular 293), 800 gun mount socket bracket assemblies, 2000 gun mount socket screws, 800 gun mount socket bracket studs, 800 gun mount socket bracket index plumbers, and 1000 socket gun mount lock springs (Circular 285).

Board of Trustees, Waterworks Department, Hammond, Ind., asks bids until Dec. 3 for filtration plant equipment for municipal waterworks, including pumping machinery and accessories, electrical transformers, switchboard, controllers, switching equipment, etc., gate valves, sluice gates, piping and filter equipment, water tank, filter tanks, etc. Fund of \$600,000 has been arranged through Federal

SUNOCO'S EFFICIENCY



... As Shown in the Making of Empire Nuts



THE Coraopolis, Pa., plant of the Russell, Burdsall & Ward Bolt and Nut Company is well known. There are produced the widely used Empire nuts of every size, shape and style . . . nuts noted for their strength, fit and finish.

Machines Produce at Rated Capacity . . . With SUNOCO

In the R. B. & W. machines which cut the spool of steel, cold punch, chamfer, trim and burnish in one operation, a cutting lubricant of dependable performance is essential. This cutting oil must prevent overheating and drawing of the temper of dies, punches and cutters. It is significant that Sunoco Emulsifying Cutting Oil is chosen . . . and that these machines produce at rated capacity.

Smooth, Accurate Threads, Too

All day long (and frequently throughout the night) Sunoco does its part in the R. B. & W. nut tapping machines. And smooth, accurate threads are the result.

Aids Tools in Giving Best Service

In the manufacture of nuts, punch, die and tap life is most important. Time lost in resetting must be held to a minimum. The Russell, Burdsall & Ward Bolt and Nut Company find that with Sunoco, they secure long runs between tool settings, tool maintenance is reduced, and greater accuracy with better finish is obtained.

WE suggest a trial of Sunoco in *your* plant — and under your own operating conditions. Your correspondence will have the prompt attention of our cutting oil engineers.

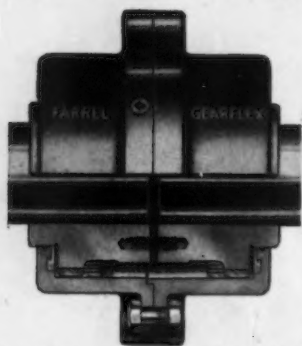
SUN OIL COMPANY
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SUNOCO

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All Contact Surfaces of FARREL GEARFLEX COUPLINGS

Operate in Oil



17 standard sizes from 2 inch to 30 inch bores and special designs for individual conditions.
Send for copy of Gearflex Coupling Bulletin No. 437.

All points of contact in Farrel Gearflex Couplings are fully protected by constant immersion in an oil bath. The load-carrying surfaces are the teeth of the external and internal gears, protected by an oil film, which provides a cushioning effect, giving a high degree of quietness in operation and, by minimizing wear, preserves the concentricity of the floating sleeve in relation to the hubs.

There are no bushings, springs, pins or grids to wear out. They require no attention except occasional oiling. Their simplicity, accuracy and rugged construction insure long life and dependable performance.

FARREL-BIRMINGHAM COMPANY, INC.

333 VULCAN ST., BUFFALO, N. Y.

aid. Greeley & Hanson, 6 North Michigan Avenue, Chicago, are consulting engineers.

Antioch Power Co., Linton, Ind., affiliated with Linton Summit Coal Co., Linton, has begun work on new electric power plant, about five miles from city, for local light and power supply. Cost close to \$200,000 with transmission and distribution lines.

Safety Air Transportation Co., Indianapolis, care of Arthur Williams, 314 West Twenty-fifth Street, recently organized, has plans for new one-story plant for manufacture of aircraft of special safety type. Site has been secured on Allisonville Road. Cost about \$40,000 with equipment.

WASHINGTON DISTRICT

Globe Brewing & Mfg. Co., 3277 South Hanover Street, Baltimore, has let general contract to Price Construction Co., Maryland Trust Building, for four-story and basement addition, 20 x 75 ft. Cost over \$75,000 with equipment. Herbert Aiken, 4115 Ridgewood Avenue, is architect.

General Purchasing Officer, Panama Canal, Washington, asks bids until Nov. 27 for 50,000 ft. rigid steel conduit, 2000 admiralty metal condenser tubes, wrought iron grilles, metal safety treads, 400 ground wire support brackets for track-span towers, 36 panel boards, four transformers, 1000 toggle switches, bar copper, one loop and field coil winder, and other supplies (Schedule 3011).

Chesapeake & Ohio Railroad Co., Richmond, Va., plans rebuilding main grain elevator at Newport News, Va., recently destroyed by fire. Loss over \$1,000,000, exclusive of stock, but including screening, elevating, conveying and other equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Nov. 27 for three electric hoists, each about 1000-lb. capacity (Schedule 3711) for Eastern and Western yards.

WESTERN PA. DISTRICT

Kanawha Valley Power Co., Charleston, W. Va., plans early construction of new hydroelectric generating plant at Federal Dam No. 1, Kanawha River, near Winfield, W. Va. It will include new transmission line for connection with present high-tension system of company.

Oil City Brewing Co., Oil City, Pa., now operating under receivership, is arranging for early reorganization. Plant will be improved and additional equipment provided.

Parts & Equipment Co., Pittsburgh, has been organized by P. W. Matthews and H. W. Claypool, Diamond Building, to manufacture motor truck equipment and parts.

SOUTHWEST

Liquid Carbonic Co., 2000 Baltimore Avenue, Kansas City, Mo., is considering new one and two-story dry ice-manufacturing plant. Cost close to \$40,000 with machinery. Frank C. Becker is head.

Kansas City Power & Light Co., Fourteenth Street and Baltimore Avenue, Kansas City, Mo., plans new power line addition on part of Highway No. 50, Jackson County.

M. K. Goets Brewing Co., Sixth and Albermarle Streets, St. Joseph, Mo., has begun superstructure for three and six-story and basement brewing plant, 105 x 374 ft., at Kansas City, Mo. A one-story service, repair and garage building, 72 x 83 ft., will be built. Cost over \$500,000 with equipment. George L. Lahle, 111 West Washington Street, Chicago, is architect.

Common Council, Chcotah, Okla., asks bids until Nov. 26 for pumping machinery and accessories, pipe lines, fittings, etc., for municipal waterworks. Fund of \$60,000 has been arranged through Federal aid. Burns & McDonnell Engineering Co., 107 West Linwood Boulevard, Kansas City, Mo., is consulting engineer.

Border Foundry & Machine Co., Mirando City, Tex., plans rebuilding part of machine and mechanical shops, recently destroyed by fire. Loss about \$30,000 with equipment.

Common Council, Abernathy, Tex., plans early call for bids for 50,000-gal. elevated steel tank on 75-ft. steel tower, pumping machinery for main and booster service, pipe lines, meters, fittings, etc., for municipal waterworks. Financing has been arranged. H. B. Roberts, Lubbock, Tex., is consulting engineer.

Sabine Valley Gasoline Co., Shreveport, La., care of Ernest Ratcliff, Shreveport, head, has leased oil properties in Gregg County, Tex., near Sabine River, and plans erection of new gasoline refinery, including compressor station, storage and distributing units, etc. Cost over \$90,000 with machinery.

BUFFALO DISTRICT

Board of Education, City Hall, Buffalo, plans manual training department in new multi-story high school on Suffolk Street. Cost close to \$1,100,000. Financing has been arranged.

Lyell Products Co., Inc., Rochester, N. Y., has been organized by Thomas F. Taylor, 91 Devonshire Court, and Frederick F. Jackson, 415 Electric Avenue, to manufacture pumping machinery for beer service, parts, and kindred equipment.

Marietta Co. of Canada, Ltd., 76 Bathurst Street, Toronto, manufacturer of paints, oils, varnishes, etc., has leased factory at 40 Dovercourt Road, about 10,000 sq. ft. floor space, and

will improve and remove present factory to new location, doubling capacity. Company is affiliated with Marietta Paint & Color Co., Marietta, Ohio.

Canadian Oil Co., Ltd., Petrolia, Ont., plans expansion and improvements, including new gasoline refining equipment, and steel storage tanks from 2000 to 4000 bbl. each capacity. Cost close to \$300,000 with machinery. C. A. Hale is superintendent.

SOUTH ATLANTIC

City Council, Columbus, Ga., Marshall Morton, city manager, asks bids until Nov. 23 for all-steel hangar at municipal airport, 100 x 100 ft., and 20-ft. clear height; alternate bids at same time for similar units, 80 x 100 ft., and 20 ft. clear height.

Link-Belt Co., 910 South Michigan Avenue, Chicago, manufacturer of conveying, elevating and other mechanical-handling equipment, has let general contract to C. A. Adair & Co., 73 West Peachtree Place, N. W., Atlanta, Ga., for one-story addition to branch plant at Atlanta, formerly works of Bailey-Burruss Mfg. Co., recently acquired. I. H. Barbee is manager at Atlanta.

Board of Public Works, City Hall, Jacksonville, Fla., plans extensions and improvements in municipal incinerator plants, including new equipment. Cost about \$25,000 with equipment.

MIDDLE WEST

Signal Corps Procurement District, 1819 West Pershing Road, Chicago, asks bids until Nov. 27 for telephone switchboard cable, one reel and 800 lb. solder (Circular 23).

Rock-Ola Mfg. Co., 625 West Jackson Boulevard, Chicago, manufacturer of vending machines and parts, has purchased plant of Gulbransen Co., with main eight-story unit, totaling about 250,000 sq. ft. floor space, and 19 smaller buildings, aggregating 600,000 sq. ft. floor area. Purchasing company will remodel majority of property for new plant, providing about six times present floor space; about 90,000 sq. ft. space has been leased to Gulbransen Co., which will concentrate piano production here. David C. Rockola is president of purchasing company.

Brewerton Coal Co., Sesser, Ill., plans rebuilding part of coal-mining plant, including generator house, hoist house and other units, recently destroyed by fire. Loss over \$75,000 with equipment.

Quartermaster Depot, 1819 West Pershing Road, Chicago, asks bids until Dec. 10 for 1203 snow shovels and 840 steel garden rakes (Circular 127).

International Condenser Corp., 2508 South Michigan Avenue, Chicago, has been organized by Benjamin Weiner and Maurice Kling, to manufacture condensers and kindred equipment.

City Council, Jamestown, N. D., has secured approval of State Supreme Court for new municipal electric light and power plant, and will proceed with project in near future. Fund of \$650,000 is being secured through Federal aid. Burlingame & Hitchcock, Sexton Building, Minneapolis, Minn., are consulting engineers.

Construction Service, Veterans' Administration, Washington, asks bids until Dec. 4 for hardware and equipment for 15 buildings at institution at Danville, Ill.; until Nov. 27 for one dump body and hand hydraulic hoist; two trucks, platform body, removable sides (Proposal 265-M) for North Chicago, Oteen and Tuskegee.

Lavine Gear Co., 634 East Keefe Avenue, Milwaukee, manufacturer of steering gears for motor trucks, buses, tractors, etc., is adding new line of passenger car gear assemblies and is investing about \$50,000 in new tools and other equipment.

Mid-West Micrometer & Tool Corp., Milwaukee, has been incorporated with \$25,000 capital stock to manufacture line of precision tools, designed by John M. Mischker, mechanical engineer, 2023 North Farwell Avenue, in association with J. R. Hatch and O. C. Bader. Production plans are being formulated.

Modern Machine Works, Inc., 158 North Milwaukee Street, Milwaukee, has established additional production unit at 2207 Kirkwood Avenue, Cudahy. Company manufactures power lawn mowers, small crankshaft and transmission shafts for refrigerator compressors, air conditioning machines, etc., and also does production jobbing as general machinist.



Photo by Ernest Graham

INTERLAKE Iron Corporation's six blast furnaces and four by-product coke plants, with annual capacity of 1,200,000 gross tons of pig iron and 2,000,000 net tons of coke, are strategically located with relation to proximity of markets and economy of transportation.

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PIG IRON . . . All Grades
FEDERAL PERRY TOLEDO ZENITH

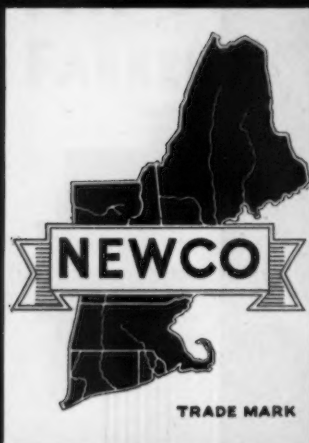
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PLANTS: CHICAGO ERIE
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WIRE

OIL TEMPERED WIRES

Rounds—Rectangulars—Shapes
Carbon, Chrome Vanadium
or other Alloys
Swedish and Domestic
Acid—Basic or Electric Furnace Quality
*Laboratory control of all processes
insures uniform quality.*

LARGE STOCK CARRIED IN DETROIT
WAREHOUSE: 1501 BEARD ST.

NEW ENGLAND HIGH-CARBON WIRE CO.
MILLBURY, MASS.

◀ MICHIGAN DISTRICT ▶

Nineteen Hundred Corp., St. Joseph, Mich., manufacturer of electric washing machines, ironers, etc., subsidiary of Upton Machine Co., St. Joseph, has let general contract to M. W. Stock, St. Joseph, for one-story addition, about 35,000 sq. ft. floor space, in part for storage and distribution. Cost about \$45,000 with equipment.

Copeland Products, Inc., Mount Clemens, Mich., manufacturer of electric refrigerator units and allied equipment, and Trupar Mfg. Co., Dayton, Ohio, manufacturer of similar equipment, both operated by Winslow-Baker-Mayering Corp., Fisher Building, Detroit, will remove plant to former Detroit works of Lincoln Motor Car Co., which has been secured on long-time lease. Companies will carry out expansion at new location and concentrate production there.

Lau Tool & Gauge Co., Detroit, has been organized by Charles F. Lau, 1207 Wayburn Street, and associates, to manufacture tools and allied products.

Keller & Sipes Mfg. Co., 72½ North Saginaw Street, Pontiac, Mich., has been organized by James L. Keller and associates, to manufacture iron and steel products.

◀ SOUTH CENTRAL ▶

Jackson Brewing Co., New Orleans, J. F. Boreland, general manager, plans new brewery at Shreveport, La., with power house, machine shop, pumping station and other mechanical departments. Cost over \$500,000 with machinery.

Luce Packing Co., Lucedale, Miss., food packer, is planning to rebuild part of packing plant recently destroyed by fire. Loss over \$100,000 with equipment.

City Council, Jackson, La., plans installation of pumping machinery and accessory equipment, pipe lines, etc., for new municipal water system. Fund of \$41,000 has been arranged through Federal aid. F. P. Joseph, Glenmora, La., is consulting engineer.

Board of Managers, Alcorn County Electric Power Association, Corinth, Miss., has approved plans for new power transmission lines for rural service, with connection with system of Tennessee Valley Authority, from which power will be secured. Cost about \$70,000 with equipment. Guy W. Thaxton is engineer of TVA division, in charge.

Common Council, Poplar Heights, Ky., plans installation of pumping machinery and accessories, pipe lines, fittings, etc., for new municipal water system. Fund of \$31,000 has been arranged through Federal aid. H. B. Cassin, Citizens' Building, Louisville, is consulting engineer.

◀ PACIFIC COAST ▶

Bureau of Reclamation, Denver, asks bids until Dec. 3 for machine tools for Boulder power plant, Boulder Canyon, California-Nevada, including one 24-in. and one 10-in. lathes and equipment, one 24-in. upright drill, one 36-in. shaper and equipment, and one 10-in. pedestal grinder and equipment (Specification 641-D); two motor-driven deep-well pumping units with control equipment for Government camp, Grand Coulee Dam, Wash. (Specification 640-D). Bids (no closing date stated) for cylinder gate hoists and stems, and bulkhead gates, Moon Lake, near Duchesne, Utah (Specification 605).

Coast Guard Service, San Diego, Cal., is securing fund of \$100,000 from PWA for coast guard aircraft base at Lindbergh Field, San Diego. Three hangars with shop facilities will be built.

Grace Brothers, Santa Rosa, Cal., will soon begin superstructure for three-story addition to brew-house, 40 x 40 ft., to include steel tanks and other equipment. Cost over \$50,000 with machinery. L. H. Nishkian, 525 Market Street, San Francisco, is consulting engineer.

Premier Gear & Machine Works, Inc., Thurman and N. W. Seventeenth Street, Portland, has let general contract to S. S. Parker, R.F.D. No. 1, Portland, for new one-story machine shop. Cost about \$20,000 with equipment.

Bureau of Reclamation, Earp, Cal., asks bids until Nov. 26 for electrical distribution system at Government camp, Parker Dam, Parker Dam Project, California-Arizona; also for water supply system, including pumping machinery and accessories, pipe lines, etc. (Specification 638-D).

Escondido Orange Association, Escondido, Cal., W. L. Carson, general manager, has let general contract to William P. Neil Co., 4814 Loma Vista Avenue, Los Angeles, for one-story and basement packing plant, 120 x 300 ft. Cost about \$100,000 with conveying, loading, packing and other equipment. W. W. Ache, 1616 Fourth Avenue, Los Angeles, is architect.

Psenner-Paufig Automotive Parts Co., Los Angeles, has been organized by John Psenner and Arthur N. Paufig, care of Fred G. Wade, Pacific National Building, to manufacture automobile parts and other equipment.

◀ FOREIGN ▶

Ministry of Labour, Paris, France, M. Marquet, director, has approved plans for new works in Lievin-Angrès district for production of petrol from coal, with furnace units, storage and distribution tanks, etc. It will

have large capacity for synthetic petrol. Cost close to \$2,500,000 with machinery.

Department of Stores, Bengal Nagpur Railway, Kidderpore, Calcutta, India, plans purchase of bolts, nuts, rivets, washers, cotter pins, split pins, rings, vacuum brake fittings, mechanical belting and other supplies and fittings.

Spillers, Ltd., Close, Newcastle-on-Tyne, England, has plans for new flour milling plant on Corporation Quay on Tyne waterfront, with mechanical-handling facilities for grain, etc., power house and other structures. Cost close to \$2,000,000 with machinery. City Council is interested in project and has tendered offer for present mill of company, totaling about \$135,000, to insure erection of new mill, and will hold other property as a municipal investment.

October Machine Tool Orders Best Since May

THE October index of machine tool orders rose to 43.9, compared with 36.2 in September, according to the National Machine Tool Builders Association, Cleveland, which uses 1926 orders as its base. Most of the gain was in domestic orders, the index of which rose from 29.4 to 35.1, while the corresponding figures on foreign orders were 6.8 and 8.8 respectively. October orders were fairly well distributed, although the larger companies as a group are doing somewhat better than the smaller.

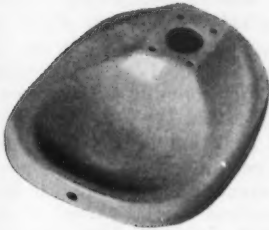
October Business Gain More Than Seasonal

BUSINESS improved a little more than seasonally in October, according to the monthly report of the conference of statisticians of the National Industrial Conference Board. Declines in production were more than balanced by gains in building and engineering construction. General distribution and retail trade advanced in October by seasonal amounts over September levels. Commodity prices declined during the month; rallies were in evidence after election day in November.

Security prices advanced moderately in October, but the net gain came as a result of irregular movements. The cost of living in October showed the first decline since April; the decline was slight and was due almost entirely to a drop in food prices.

The most noticeable change in the business picture in October was the upturn in residential construction. The gain in awards was the first since June. Other construction awards, for public work in particular, showed measurable improvement. Automobile output fell off more than seasonally in October. Steel and iron production made more than seasonal gains. Electric power output advanced by an approximately seasonal amount. Bituminous coal produced showed continued improvement in October. The textile industry was stimulated to activity during the month after reaching a new low depression level in September during the strike.

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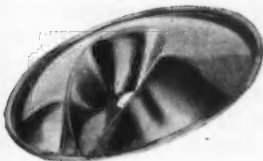


\$3,641 was saved on this G. P. & F. steel stamped base which replaced a cast iron base.

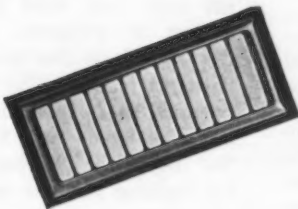
Considerable ingenuity was required to develop the tools and dies to make this different washing machine tub.



G. P. & F. has made many types of covers like this—drawn in one piece.

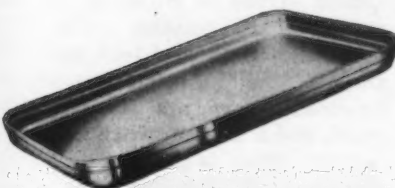
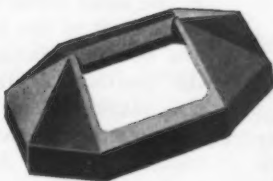


A sample of grill drawn in the 19-acre G. P. & F. plant.



This seamless steel case produced by G. P. & F. and given a lacquer finish.

A ticker top drawn and formed from a single sheet.



This stainless steel bottom for sink permitted attaching sides so seam was an inch above the bottom.

COSTS of sheet metal parts are kept down by the proper consideration of the various angles that affect production of pressed and stamped metal parts and by the uniform perfection of each piece.

The number of operations depend on the metal—on the finish that is to be applied later—on the radii of corners—on the depth of draw, the slant of the sides, etc., etc.

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When using G. P. & F. Stampings you save time and expense in your plant. They reach you ready for assembly, and eliminate the need for the little extra grinding and filing here and there that lead to increasing your costs. Thousands of users in all parts of the country have saved in this way.

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Before you place another order for pressed metal parts—or while your new product or model is still on the drawing board—let us make suggestions.

Send us sample, or blueprint, or other data and we will make recommendations based on over a half century of experience that may be the means of reducing cost of the part, the dies and the handling in your plant. Booklet mailed on request.

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Urges Government To Speed Recovery First

RELIEF, recovery and reform and their influence on permanent employment were analyzed in an address on the "Problems Confronting the Durable Goods Industries," by Franklin R. Hoadley, vice-president, Farrel-Birmingham Co., Inc., Ansonia, Conn., and chairman of the code authority of the gray iron foundry industry, delivered before the Providence section of the American Society of Mechanical Engineers on Nov. 9.

"Depression," the speaker said, "is essentially a condition of unemployment. Recovery alone can bring about reemployment and an end to the depression. Reemployment is the only satisfactory form of relief. An aroused and informed public opinion will demand necessary reforms without the cruelty and injustice of impracticable and idealistic reforms which tend to retard employment. Therefore, since recovery will assure the greatest measure of relief, and since reform can be of little benefit without recovery, let us marshal the three R's of the depression into their proper sequence of recovery, relief and reform, and put the greatest emphasis on the leader of these forces, recovery."

The speaker outlined the factors influencing recovery and went on to say, "If the restraints to production in the heavy industries are removed there is every reason to be sure of a rapid improvement in business. There are tremendous frozen assets which will be released when general confidence has been restored. . . . We are restrained by artificial barriers from making use of the factors which have always made for prosperity. We have millions of idle workers seeking jobs and a huge volume of money and credit seeking employment. It has been estimated that there is one hundred billion dollars' worth of accumulated work waiting to be done, and we have all the factors with which to do it except profit possibilities, sufficient investment freedom and monetary confidence."

"There is still great fear of planned economy and its results. Shall planned economy, with curtailment of production and reduced standard of living, replace the philosophy of plenty which advanced the country to levels of general prosperity known nowhere else in the world? Our average standard of living is the sum total of all the goods and services produced, divided by the number of people there are to use them. Prosperity and a rising standard of living cannot exist in the face of restriction of production and a diminishing output of goods and services. The less the volume produced, the smaller each person's share and standard of living will be. May

we not seek to apply corrective measures to the unbalanced conditions that exist and return to the distribution of all goods and services to all of the people, which has been the aim of farsighted men for ages past?"

In conclusion, Mr. Hoadley urged the adoption of "constructive policies which will assure prosperity; assurance to private enterprise that the profit incentive will continue to receive public approval as an energizing motive for economic activity; public recognition that the only legitimate purpose of taxation is to provide the necessary revenue for Government; early reassurance of a balanced budget and removal of the threat of uncontrolled inflation or sudden and arbitrary change in our monetary policies."

Machine for Regulating Large Die Blocks

(Concluded from Page 33)

the rheostat will gradually be cut out. When the desired speed is reached the finger is taken off the button and the spindle will continue to revolve at the rate attained at that instant.

The third or center section controls the head feed. Here again are faster, slower, run and stop buttons and also buttons for traverse, fast feed and jog. When the fast feed button is pushed the feed is run up to its highest rate and held there until the button is released when the feed drops back to the rate at which the rheostat is set. The traverse button permits 15 ft. per min. on the table and the heads and $7\frac{1}{2}$ ft. per min. for the rail. The jog button is used for inching and the movement can be as little as 0.001 in. A selector switch is provided for direction of travel. The next pendant section controls the table feed and the bottom section controls the rail feed. An emergency stop button, of unusual sensitiveness is placed near the bottom of the pendant.

On the stationary control panel are push buttons and switches arranged in the same order as on the pendant. At the left of the push button column are five dial indicators which show the positions of the rheostats. The line markings on these dials correspond with the markings on the push button sections. At the right of the push buttons are other indicators. The two at the top of the panel show spindle speeds in r.p.m. at the ram and standard spindles. The three lower dials show head feed, table feed and rail feed in inches per minute. Overload relays are set from this panel, and a master switch throws all controls either to pendant or stationary panel. It also starts the coolant pump and the motor-generator set.